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ABSTRACT

This collection of booklets deals with minumum standards in mathematics for beginning eleventh grade students. There is a statement of the standards with related skills, a test to assess competency with accompanying answer sheet and answer key, and eight booklets presenting problems covered by six of the standards. The booklets cover: percentages; elapsed time; finding averages; real-world problems involving decimals, fractions, and percents; money; measurement using metric and customary units; and graphs. The problems to be solved are oriented toward environmental and energy subject matter. (Author/MP)

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BEGINNING ELEVENTH GRADE
STUDENT PROFILE
MATHEMATICS STANDARDS
CITRUS COUNTY, FLORIDA

Citrus County School District
1507 West Main Street
Inverness, Florida 32650

Sponsored by:

Office of Environmental Education
Department of Education
Knott Building
Tallahassee, Florida 32301

1979

SE 034 028

BEGINNING ELEVENTH GRADE
STUDENT PROFILE
MATHEMATICS STANDARDS
CITRUS COUNTY, FLORIDA

NAME_____

STANDARDS	NO.	SKILLS			
#C ROUND NUMBERS	1.	Round number less than 100 with no more than 3 decimal places.			
	2.	Round mixed number with whole number less than 100 to nearest whole number.			
#D ORDERING	3.	Put in order any three whole numbers less than 10 million.			
#E EQUIVALENT FORMS OF FRACTIONS, DECIMALS, & PERCENTS	4.	Identify improper fraction that is equivalent to mixed number having a whole number component less than 100.			
	6.	Identify a decimal or percent that is equivalent to a proper fraction having a denominator of 2, 3, 4, 5, 20, 25, 50, or 1,000.			
#H MULTIPLY WHOLE NUMBERS	7.	Multiply two 3-digit numbers.			
#I DIVIDE WHOLE NUMBERS	8.	Divide a 5-digit number by a 2-digit number.			
#J ADD AND SUBTRACT FRACTIONS	9.	Add two mixed numbers having whole number components less than 100, with denominators of 2, 3, 4, 5, 6, 8, or 10.			
	10.	Subtract a whole number and a mixed number with denominators of 2, 4, 6, 8, and 10.			
	11.	Subtract two mixed numbers with denominators of 2, 4, 6, 8, and 10.			
#M MULTIPLY AND DIVIDE DECIMALS	13.	Multiply two numbers, each having no more than two decimal places.			
	14.	Divide two numbers each having no more than two decimal places.			
#N PERCENTAGE	16.	Multiply a number with no more than two decimal places and a whole number percent less than 100.			
#O MEASURE TIME, TEMPERATURE, DISTANCE, CAPACITY AND WEIGHT	17.	Determine the elapsed time between two events stated in seconds, minutes, hours, days, weeks, months, or years.			
#Q IDENTIFY THE VALUE OF COINS AND BILLS	24.	Determine equivalent amounts of up to one hundred dollars using coins and paper currency.			
#T REAL-WORLD PROBLEMS INVOLVING WHOLE NUMBERS	29.	Solve real-world problems involving averages of no more than ten numbers and no more than two distinct operations.			
	30.	Determine the solution to real-world problems involving one or two distinct whole number operations.			

BEGINNING ELEVENTH GRADE
STUDENT PROFILE
MATHEMATICS STANDARDS
CITRUS COUNTY, FLORIDA

NAME_____

STANDARDS	NO.	SKILLS			
#U REAL-WORLD PROBLEMS INVOLVING FRACTIONS, DECIMALS, AND PERCENTS	31.	Solve real-world problems involving addition or subtraction of proper fractions with unlike denominators of 2, 3, 4, 5, 6, 8, or 10.			
	32.	Solve real-world problems involving decimal fractions or percents and one or two distinct operations.			
#V SOLVE MONEY PROBLEMS	33.	Solve real-world problems involving comparison shopping.			
	34.	Solve real-world problems by finding the amount of simple interest.			
	35.	Solve real-world problems involving purchases and a rate of sales tax.			
	36.	Solve real-world problems involving purchases and a rate of discount given in fraction or percent form.			
#W MEASUREMENT PROBLEMS USING METRIC AND CUSTOMARY UNITS	37.	Solve problem related to length, width, or height, using metric or customary units up to kilometers or miles, conversion within the system.			
	38.	Solve a problem involving the perimeter or area of a rectangular region using metric or customary units.			
	39.	Solve a problem involving capacity using units given in a table (milliliters, liters, teaspoons, tablespoons, cups, pints, quarts, gallons), conversion within the system.			
	40.	Solve a problem involving weight/mass using units given in a table (milligrams, grams, kilograms, metric tons, ounces, pounds, tons), coversion within the system.			
#X INTERPRET GRAPHS, TABLES AND MAPS	41.	Determine relationships described by line graphs, circle graphs, or tables.			
	42.	Find approximate distance between two given points on a highway map, using a scale.			

1978-79
CITRUS COUNTY
CRYSTAL RIVER HIGH

CITRUS COUNTY
BEGINNING
ELEVENTH
GRADE
MATHEMATICS
TEST
1978-79

Beginning Eleventh Grade Mathematics Test was developed to assess student competency in skills covered by the state and county minimal objectives for Mathematics.

This instrument was developed by Mathematics teachers of Citrus County Middle and High Schools.

Lee Boydstun, Inverness Middle
Randy Bryant, Crystal River Middle
David M. Dominski, Crystal River Middle
Luan Fessler, Crystal River High
Robert A. Kennedy, Crystal River High
Bennye T. Milton, Crystal River Middle
Bruce Richards, Inverness Middle
Cynthia Spooner, Citrus High

Write the letter of the correct answer on your answer sheet.

1. Round 32.645 to the nearest tenth.

   a) 32.6 b) 32.64 c) 32.65 d) 32.7

2. Round 1.098 to the nearest hundredth.

   a) 1.098 b) 1.09 c) 1.10 d) 1.11

3. Round 92.819 to the nearest ten.

   a) 92.8 b) 92.81 c) 92 d) 90

4. Round 97.685 to the nearest hundredth.

   a) 97.68 b) 97.69 c) 97.70 d) 97

5. 13 7/15 rounded to the nearest whole number is:

   a) 10 b) 20 c) 13 d) 14

6. 38 3/8 rounded to the nearest whole number is:

   a) 30 b) 40 c) 38 d) 39

7. 69 8/13 rounded to the nearest whole number is:

   a) 60 b) 70 c) 69 d) 70

8. 84 13/26 rounded to the nearest whole number is:

   a) 80 b) 90 c) 84 d) 85

9. Select the set of numbers that is in order from smallest to largest.

a) 7,986,243 - 7,986,247 - 7,985,248

b) 7,986,243 - 7,985,248 - 7,986,247

c) 7,985,248 - 7,986,243 - 7,986,247

d) 7,985,248 - 7,986,247 - 7,986,243

10. Select the set of numbers that is in order from <u>smallest</u> to <u>largest</u>.

a) 987,210 - 1,098,256 - 987,209

b) 987,210 - 987,209 - 1,098,256

c) 987,209 - 987,210 - 1,098,256

d) 1,098,256 - 987,210 - 987,209

11. Select the group of numbers that are correctly ordered from <u>smallest</u> to <u>largest</u>.

a) 6,287,453 - 6,287,428 - 6,287,429

b) 980,621 - 980,622 - 980,620

c) 9,987,431 - 986,213 - 987,212

d) 3,308,621 - 3,309,978 - 3,310,001

12. Select the group of numbers that are correctly ordered from <u>smallest</u> to <u>largest</u>.

a) 1,111,111 - 1,110,111 - 1,111,110

b) 8,602,701 - 8,602,987 - 8,798,002

c) 4,601 - 4,602 - 4,600

d) 9,002,111 - 9,004,110 - 900,211

<u>Write the letter of the correct answer on your answer sheet</u>.

13. 5 3/8 is equivalent to:

a) $\frac{29}{8}$ b) $\frac{43}{5}$ c) $\frac{53}{8}$ d) $\frac{43}{8}$

14. 12 2/5 =

a) $\frac{62}{5}$ b) $\frac{29}{5}$ c) $\frac{29}{12}$ d) $\frac{122}{5}$

15. 78 4/5 is equivalent to:

a) $\frac{784}{5}$ b) $\frac{394}{5}$ c) $\frac{317}{5}$ d) $\frac{317}{4}$

16. 60 5/6 =

a) $\frac{605}{6}$ b) $\frac{306}{6}$ c) $\frac{306}{5}$ d) $\frac{365}{6}$

17. 3/4 is equivalent to:

a) .34 b) .43 c) .75 d) .80

18. 5/25 is equivalent to which of the following percents?

a) 20% b) 25% c) 525% d) 5%

19. Which <u>decimal</u> or <u>percent</u> listed below is equivalent to 5/50?

a) 5/50 b) 10% c) 50% d) 20%

20. $\frac{625}{1000}$ is equivalent to which decimal or percent below?

a) 625% b) 6.25 c) .625 d) 62.5

<u>Write your answer on your answer sheet</u>.

21. Multiply:
$$\begin{array}{r} 576 \\ \times 493 \\ \hline \end{array}$$

a) 282,868
b) 283,968
c) 282,968
d) 283,858

22. Multiply:
$$\begin{array}{r} 394 \\ \times 652 \\ \hline \end{array}$$

a) 256,888
b) 255,788
c) 245,788
d) 246,888

23. Multiply:
$$\begin{array}{r} 709 \\ \times 417 \\ \hline \end{array}$$

a) 395,653
b) 295,653
c) 294,553
d) 285,663

24. Multiply:
$$\begin{array}{r} 952 \\ \times 609 \\ \hline \end{array}$$

a) 55,688
b) 579,768
c) 65,688
d) 580,769

25. Divide: $22\overline{)59664}$

a) 2692
b) 2814
c) 2712
d) 272

26. Divide: $69\overline{)49404}$

a) 725
b) 76
c) 706
d) 716

27. Divide: $48\overline{)96098}$

a) 202 R2
b) 2002 R2
c) 22 R2
d) 222 R6

28. Divide: $73\overline{)14966}$

a) 250 R13
b) 205 R1
c) 25 R23
d) 215 R13

29. Add:
$$\begin{array}{r} 32\ 1/4 \\ +15\ 1/2 \\ \hline \end{array}$$

a) 47 1/6
b) 47 2/6
c) 47 3/4
d) 57 1/2

30. Add:
$$\begin{array}{r} 27\ 3/5 \\ +19\ 3/8 \\ \hline \end{array}$$

a) 46 6/13
b) 46 3/13
c) 36 39/40
d) 46 39/40

31. Add
$$\begin{array}{r} 15\ 5/6 \\ +39\ 1/4 \\ \hline \end{array}$$

a) 54 6/10
b) 44 6/10
c) 55 1/12
d) 55 5/24

32. Add:
$$\begin{array}{r} 13\ 8/10 \\ +\ 9\ 1/5 \\ \hline \end{array}$$

a) 22 8/15
b) 22 9/15
c) 23
d) 22 9/10

33. Subtract:
$$\begin{array}{r} 25 \\ -13\ 3/10 \\ \hline \end{array}$$

a) 11 7/10
b) 12 3/10
c) 12 7/10
d) 38 3/10

34. Subtract:
$$\begin{array}{r} 40 \\ -25\ 3/4 \\ \hline \end{array}$$

a) 14 1/4
b) 15 3/4
c) 15 1/4
d) 25 3/4

35. Subtract:
$$\begin{array}{r} 17 \\ -12\ 5/6 \\ \hline \end{array}$$

a) 5 5/6
b) 4 5/6
c) 5 1/6
d) 4 1/6

36. Subtract:
$$\begin{array}{r} 32 \\ -29\ 3/8 \\ \hline \end{array}$$

a) 3 5/8
b) 3 3/8
c) 13 3/8
d) 2 5/8

37. Subtract:
$$\begin{array}{r} 15\ 5/8 \\ -\ 4\ 1/2 \\ \hline \end{array}$$

a) 11 4/6
b) 11 4/8
c) 11 1/8
d) 11 5/6

38. Subtract:
$$\begin{array}{r} 10\ 5/6 \\ -\ 7\ 3/10 \\ \hline \end{array}$$

a) 3 2/4
b) 3 8/15
c) 3 2/10
d) 17 8/16

39. Subtract: 14 5/8
- 8 3/4

a) 6 2/4
b) 5 7/8
c) 6 8/12
d) 6 2/8

40. Subtract: 9 3/10
- 1/2

a) 8 4/5
b) 9 2/8
c) 9 2/10
d) 8 2/8

41. Multiply: 3.14
x.85

a) 266.9
b) 1.3742
c) 2.669
d) 1374.2

42. Multiply: .23
x.12

a) .0276
b) 2.76
c) 276
d) 27.6

43. Multiply: .89
x 72

a) .6408
b) .846
c) 84.60
d) 64.08

44. Multiply: 12.8
x1.67

a) 21.376
b) 213.76
c) 2.1376
d) 2137.6

45. Divide: $38\overline{)46.74}$

a) 123
b) 1.23
c) 15.6
d) .178

46. Divide: $.18\overline{)66.24}$

a) 3.68
b) .0287
c) 368
d) 54.6

47. Divide: $140.8\overline{)84.48}$

a) .6
b) .02
c) 6
d) 20

48. Divide: $4.29\overline{)291.72}$

a) 68
b) 8.9
c) .68
d) .089

Write the letter of the correct answer on your answer sheet.

49. 58% of 12.2 = a) 2.103
b) 21.03
c) 707.6
d) 7.076

50. 93% of 146 = a) 1.3432
b) 135.78
c) 13.578
d) 134.32

(continued)

51. 17% of 38 =
a) 6.08
b) 64.6
c) 608
d) 6.46

52. 2% of 89.2 =
a) 1.784
b) .892
c) 17.84
d) 8.92

Write the letter of the correct answer on your answer sheet.

Find the time elapsed.

53. If Joe was born July 1, 1923 and died January 1, 1969, how old was he when he died?

a) 46 yrs. b) 46 yrs. 6 mo. c) 45 yrs. 6 mo. d) 45 yrs. 7 mo.

54. Karen ran a race in 4 min. and 32 seconds. Bill ran a race in 3 minutes and 59 seconds. How much more time did it take Karen than Bill to run the race?

a) 33 seconds b) 1 min. 27 seconds c) 1 min. 83 sec. d) 83 sec.

55. Bob was on a diet for 5 days and 8 hrs. Susan was on a diet for 8 days and 4 hours. How much longer did Susan stay on her diet?

a) 3 days, 4 hrs. b) 2 days, 20 hrs. c) 2 days, 6 hrs. d) 2 days, 16 hrs.

56. John left to go hunting at 4:30 A.M. and returned at 3:20 P.M. that afternoon. How long was he gone?

a) 7 hrs, 50 min. b) 10 hrs, 50 min. c) 1 hr, 10 min. d) 11 hrs, 50 min.

Match each amount of money with its equivalent amount.

57. $63.58 is equal to:

a) six $10 bills, 2 quarters, 8 pennies
b) six $10 bills, 3 $1 bills; 2 quarters, 8 pennies
c) three $20 bills, 2 quarters, 1 nickel, 3 pennies
d) three $20 bills, 4 dimes, 4 nickels

58. $36.04 is equal to:

a) one $20 bill, three $5 bills, one $1 bill, four pennies
b) one $20 bill, one $10 bill, six ones
c) two $10 bills, one $10 bill, four pennies
d) three $10 bills, one $5 bill, four pennies

Match money continued

59. $ .84 is equal to:

a) 5 dimes, 1 quarter, 3 nickels
b) 3 quarters, one nickel, four pennies
c) three quarters, one dime
d) six dimes, 1 quarter

60. $12.19 is equal to:

a) one $10 bill, one $2 bill, 3 nickels, 2 pennies
b) two $5 bills, two $2 bills, 1 dime, 1 nickel
c) one $10 bill, one $2 bill, 1 dime, 9 pennies
d) six $2 bills, four nickels

Choose the letter of the correct answer and write it on your answer sheet.

61. Find the average test score of the students in Mr. Sim's class, whose scores were 87, 71, 62, 96, 85, 75, 52, 43, 89, 100.

a) 76 b) 77 c) 86 d) 87

62. Find the average weight of the front line of the football team whose weights were 180 lbs., 200 lbs., 175 lbs., 200 lbs., 170 lbs., 190 lbs., 180 lbs.

a) 175 lbs. b) 180 lbs. c) 185 lbs. d) 190 lbs.

63. Find the average height of these North American mountain peaks.

Logan (Canada) 6050m McKinley (Alaska) 6134m
Citlalte'p'etl (Mexico) 5700m Foraker (Alaska) 5304M

a) 5811m b) 5812m c) 5813m d) 5814m

64. Find the average distance of the standing broad jump made by these students.

Joe 107cm Sam 116cm Jerry 95cm George 99cm David 113cm

a) 105cm b) 106cm c) 107cm d) 108cm

Write the correct answer on your answer sheet.

65. What is the length of the fourth side of a pasture if the total distance around is 7450m and the other three sides are 1230m, 2890m, 1760m?

a) 1580m b) 33332.5m c) 13,330m d) 1570m

66. There are 3529 books in the school library and 18,748 books in the city library. If the mayor donates his collection to the libraries, the combined total in both libraries will be 24,631 books. How many books will the mayor donate?

a) 27,285 b) 46,908 c) 2354 d) 22,277

67. Room #232 has 184 folding chairs. How many rows of 8 chairs can be formed?

a) 29 b) 23 c) 1472 d) 416

68. Each machine in a bottle factory can produce 125 bottles in a minute. There are 32 machines. How many bottles can be produced each minute if all machines are used?

a) 4000 b) 157 c) 3.9 d) 93

Write the correct answer on your answer sheet.

69. David worked 5/6 hour on Monday, 1/2 hour on Tuesday, and 1/2 hour on Friday. How many hours did he work on Monday and Tuesday?

a) 68 b) 5/8 c) 5/12 d) 1 1/3

70. A set of metal knives weigh 5/6 pound. A plastic set weighs 3/8 pound. How much less does the plastic set weigh?

a) 8/14 b) 3/14 c) 11/24 d) 5/8

71. Mr. Joyner has a sheet of metal that is 1/8 inch thick and another that is 1/10 inch thick. What would the total thickness be if he put these two pieces of metal together?

a) 2/80 b) 2/18 c) 9/40 d) 1/80

72. A machinist starts out with a piece of metal that is 3/4 inch thick. He then rolls the metal until it measures 1/5 inch thick. How much has the thickness been reduced?

a) 11/20 b) 4/9 c) 2/9 d) 3/20

Choose the letter of the correct answer and write it on your answer sheet.

73. During a local sale, Sears advertised their suits at 40% off the regular price of $95. How much can be saved by taking advantage of this sale?

a) $55 b) $38 c) $50 d) $40

74. What is the combined thickness of two pieces of metal, one measuring 1.080 inches and the other measuring .67 inches?

a) 1.147 inches b) 1.750 inches c) 1.017 inches d) .510 inches

75. Randy's car averages 12.4 miles for each gallon of gasoline. At that rate, how far could the car travel using 7.8 gallons of gasoline?

a) 86.86 miles b) 86.72 miles c) 89.02 miles d) 96.72 miles

76. Forty percent of the employees at Publix are High School Seniors. There are 55 employees in all. How many of the employees are High School Seniors?

a) 20 b) 2 c) 22 d) 12

Choose the correct answer.

77. Macaroni is 27¢ for 16 ounces at one store, and 39¢ for 24 ounces at another store. If the quality is the same, which is the better buy?

a) 16 ounces for 27¢ b) 24 ounces for 39¢

78. You can buy 6 ounces of instant coffee for $1.19 at John's Grocery and 10 ounces for $1.89 at Bird Market. If Mrs. Martin has a 10¢ coupon for a 6 ounce size, which is the better buy?

a) 6 ounces for $1.19 b) 10 ounces for $1.89

79. The Sports Store sells golf balls at $2 for 3 or $3.50 for 5. Which is the better buy?

a) $2 for 3 b) $3.50 for 5

80. Joan wants to buy some records that are regularly $1.29 each. She can buy 2 for $2.49 on sale at the Record Shop, or 3 for $3.66 at the Spin Shop. Which is the better buy?

a) 2 for $2.49 b) 3 for $3.66

S T O P

Choose the correct answer.

81. Mr. Bryant has $1365.00 in a savings account. The bank pays 6% interest each year. Find the amount of interest after one year.

a) $1283.10 b) $227.50 c) $8.19 d) $81.90

82. Mr. Kennedy borrowed $950 for 1 year. He is required to pay interest at the rate of 9% yearly. How much interest will he pay?

a) $8.55 b) $85.50 c) $1035.50 d) $864.50

83. Miss Fessler borrowed $1600 for a period of 2 years. She is to pay interest at the rate of 8% a year. How much interest will she have to pay?

a) $256.00 b) $25.00 c) $128.00 d) $12.80

84. Mrs. Jackson had $2445 in a savings account that paid interest at the rate of 8% a year. How much interest did Mrs. Jackson receive in 1½ years?

a) $195.60 b) $19.56 c) $293.40 d) $29.34

Write the correct answer on your answer sheet.

85. Jon bought a wallet for $3.68 and a hat for $4.29. The sales tax rate is 4%. What was the final cost? (Hint: Sales tax is found on the sum of the 2 pieces.)

a) $8.18 b) $8.29 c) $7.97 d) $ .32

86. A bottle of soda cost 35¢. The sales tax rate is 4%. What is the total cost of 5 bottles of soda?

a) $1.82 b) $1.78 c) $1.75 d) $ .37

87. Gasoline cost 63¢ a gallon. The sales tax rate is 5%. What is the total cost of 10 gallons of gasoline?

a) $6.62 b) $6.30 c) $6.61 d) $ .66

88. The sales tax rate is 3%. Find the sales tax on a purchase of $14.23.

a) $14.66 b) $14.65 c) $14.60 d) $ .43

Choose the correct answer.

89. A chair that is regularly priced $128 can be bought on sale. There is a 25% discount. Find the amount of money of the discount.

a) $96.00 b) $160.00 c) $32.00 d) $103.00

90. A transistor radio is regularly priced at $42.50. K-Mart is selling it for 1/5 off the regular price. How much will the radio cost?

a) $8.50 b) $34.00 c) $51.00 d) $40.38

91. An electric toothbrush cost $29.50. There is a 20% discount. Find the amount of discount.

a) $29.30 b) $23.60 c) $35.40 d) $5.90

92. A new car has a list price of $9600. During the end of the year close-out sale the price was reduced 15%. How much did the car cost?

a) $1440 b) $8160 c) $9585 d) $1500

Write your answer on your answer sheet.

93. The greatest depth of the Atlantic Ocean is 8381 meters. The greatest depth of the Pacific Ocean is 11 km. By how many meters does the greatest depth of the two oceans differ?

a) 2,619m b) 8,370m c) 2,619km d) 8,370km

94. The height of the shortest man is 673mm. The height of the shortest woman is 58.9cm. How much taller is the shortest man than the shortest woman?

a) 614.1cm b) 84mm c) 94cm d) 614.1mm

95. The weight of the heaviest domestic cat is 19.1kg. Find his weight in grams.

a) 1.91g b) 191g c) .0191g d) 19100g

96. Mr. Allen dug a trench in his backyard to hold pipes for a swimming pool. One day he dug 9 ft.4in. The next day he dug 16ft.3in. The third day he dug 10ft.10in. How long was the trench?

a) 36ft. 5in. b) 35ft. 5in. c) 36ft. 7in. d) 35ft. 7in.

Choose the correct answer.

97. John Johnson wanted to build a fence around his backyard to keep his goat from eating his neighbors roses. His backyard was a rectangle that was 11 meters long and 9 meters wide. How many meters of fencing should he buy?

a) 20 meters b) 31 meters c) 40 meters d) 99 meters

98. Billy Blue wanted to put sod down on his front yard. The sod was cut into pieces that were one square foot each. The yard was a rectangle that measured 25ft. by 20ft. How many pieces of sod should he order?

a) 45 pieces b) 90 pieces c) 500 pieces d) 1000 pieces

99. Peter Pan planned to carpet his bedroom floor. The floor is a rectangle that is 12ft. by 15ft. How many square yards of carpet should he buy?

a) 27 square yards
b) 180 square yards
c) 20 square yards
d) 54 square yards

100. The floor of Gary Grouper's classroom is covered by square foot sized tiles. The room measures 20ft. by 20ft. What is the area of the floor?

a) 20 square feet
b) 40 square feet
c) 400 square feet
d) 220 square feet

Directions: Read the table below and answer the questions.

1000 milliliters (ml)	=	1 liter (l)
3 teaspoons	=	1 tablespoon
2 cups	=	1 pint
2 pints	=	1 quart
4 quarts	=	1 gallon

101. Four gallons of ice cream will fill how many pint containers?

a) 32 pint containers
b) 16 pint containers
c) 8 pint containers
d) 4 pint containers

102. How many teaspoons of cough syrup can be taken from a jar containing 26 tablespoons full?

a) 52 teaspoons
b) 26 teaspoons
c) 104 teaspoons
d) 78 teaspoons

103. A 20l container would hold how many ml?

a) 2,000ml b) 20,000ml c) 200ml d) .02ml

104. If you had 32 cups of milk, you could fill how many quart jars?

a) 16 quart jars b) 4 quart jars c) 8 quart jars d) 64 quart jars

Directions: Read the table below and answer the questions.

1000 grams	=	1 kilogram (kg)
1000 milligrams (mg)	=	1 gram (g)

105. A television weighs approximately 19kg. What is its weight in grams?

a) 1,900 grams
b) 19 grams
c) 19,000,000 grams
d) 19,000 grams

106. A small paper clip weighs approximately 515mg. What is its weight in grams?

a) 515g b) 51.5g c) .515g d) 5.15g

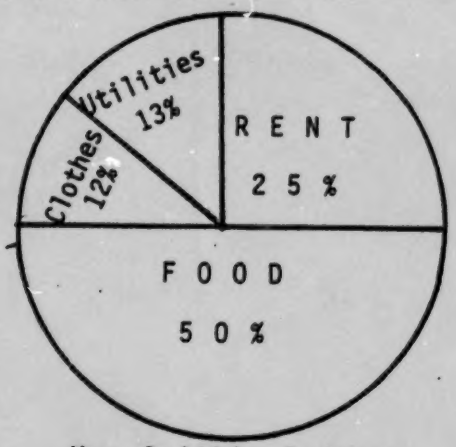
107. A station wagon weighs 2181kg. What would it weigh in grams?

a) 21,810g b) 2,181,000g c) 2.181g d) 218,100g

108. A quarter weighs approximately 6,000mg. What would it weigh in grams?

a) 60 grams b) 6 grams c) 6,000,000 grams d) 600 grams

Directions: Read and interpret the graph below. Choose the correct answers.



Mr. Smith's Budget

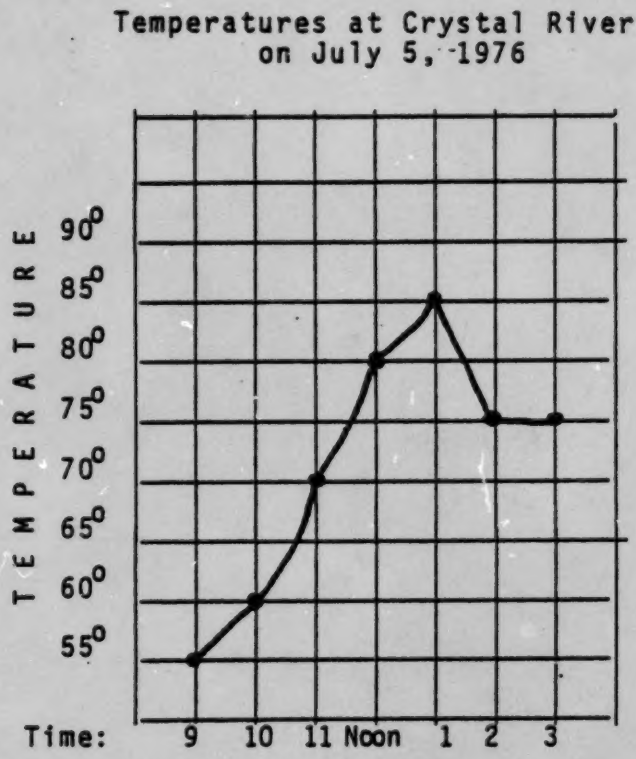
109. If Mr. Smith earns $9000 a year, how much would he spend on food in one year?

a) $5000 b) $4600 c) $5600 d) $4500

110. What percent of his annual income is not spent on food?

a) 45% b) 50% c) 25% d) 52%

Directions: Read and interpret the graph below. Answer the questions that follow.



111. Using the graph above, what was the highest temperature recorded in Crystal River on July 5, 1976.

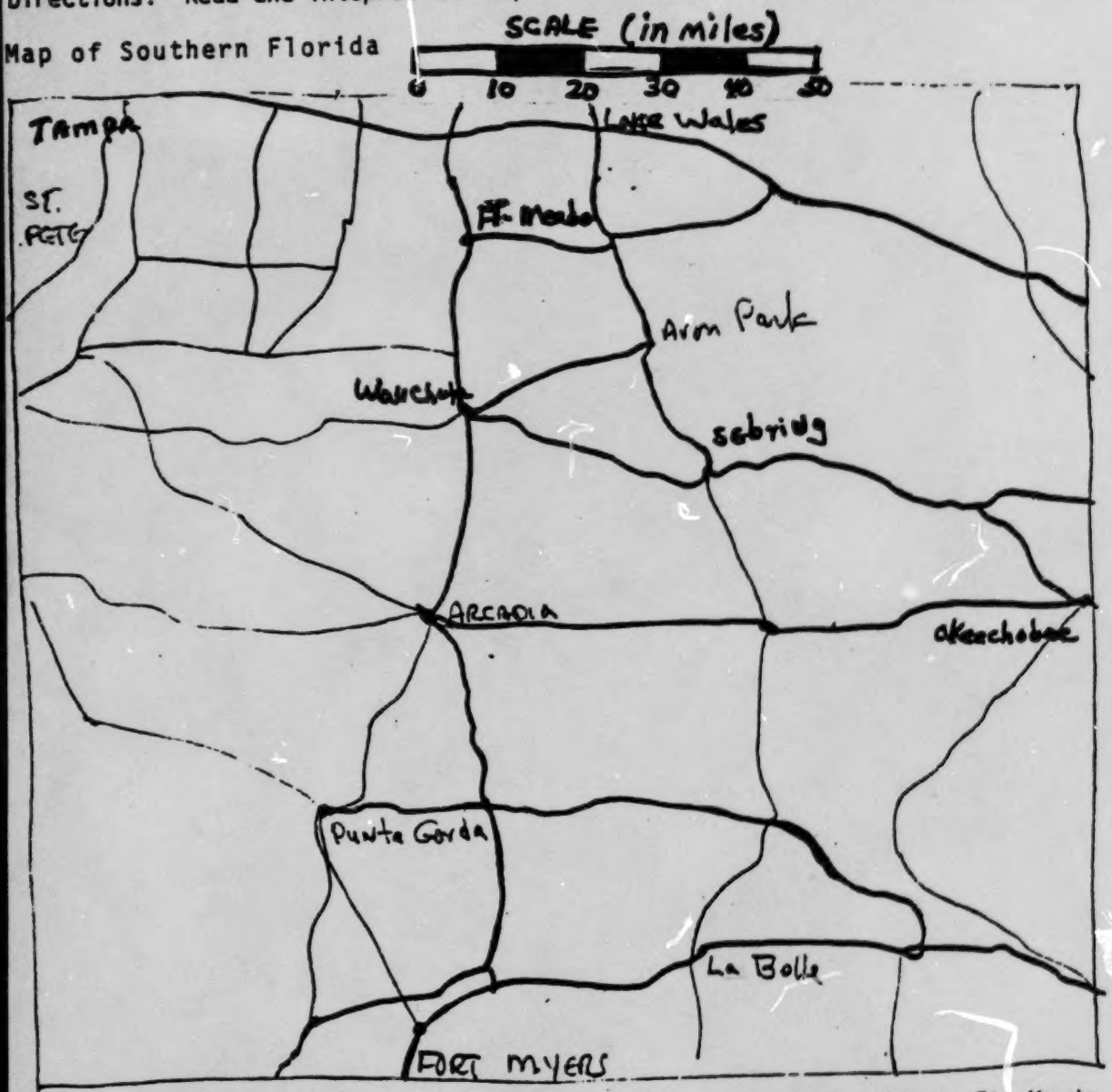
a) 86° b) 84° c) 80° d) 85°

112. What was the temperature at noon?

a) 55° b) 70° c) 85° d) 80°

Directions: Read and interpret the map below. Answer the questions that follow.

Map of Southern Florida



113. Use the scale and find the approximate distance from Arcadia to Ft. Meade.
a) 44 miles b) 50 miles c) 40 miles d) 200 miles

114. Use the scale and find the distance from Punta Gorda to Fort Myers.
a) 20 miles b) 30 miles c) 40 miles d) 50 miles

115. Use the scale and find the approximate distance from Arcadia to Okeechobee.
a) 60 miles b) 70 miles c) 80 miles d) 90 miles

116. According to the scale above, what is the distance from Wauchula to Sebring?
a) 20 miles b) 25 miles c) 30 miles d) 40 miles

THE END

CITRUS COUNTY BEGINNING

ELEVENTH GRADE

MATHEMATICS TEST

NAME _____

TEACHER _____

DATE _____ PERIOD _____

A N S W E R K E Y

(page 1 of 2)

#C 1	#H 7	#M 13	#T 29
1. A	21. B	41. C	61. A
2. C	22. A	42. A	62. C
3. D	23. B	43. D	63. B
4. B	24. B	44. A	64. B
#C 2	**#I 8**	**#M 14**	**#T 30**
5. c	25. c	45. b	65. d
6. c	26. d	46. c	66. c
7. d	27. b	47. a	67. b
8. d	28. b	48. a	68. a
#D 3	**#J 9**	**#N 16**	**#U 31**
9. c	29. c	49. d	69. d
10. c	30. d	50. b	70. c
11. d	31. c	51. d	71. c
12. b	32. c	52. a	72. a
#E 4	**#J 10**	**#O 17**	**#U 32**
13. d	33. a	53. c	73. b
14. a	34. a	54. a	74. b
15. b	35. d	55. b	75. d
16. d	36. d	56. b	76. c
#E 6	**#J 11**	**#Q 24**	**#V 33**
17. c	37. c	57. b	77. b
18. a	38. b	58. a	78. a
19. a	39. b	59. b	79. a
20. c	40. a	60. c	80. b

CITRUS COUNTY BEGINNING

ELEVENTH GRADE

MATHEMATICS TEST

NAME _____

TEACHER _____

DATE _____ PERIOD _____

A N S W E R K E Y

(page 2 of 2)

#V 34

81. d
82. b
83. a
84. c

#V 35

85. b
86. a
87. a
88. d

#V 36

89. c
90. b
91. d
92. b

#W 37

93. a
94. b
95. d
96. a

#W 38

97. c
98. c
99. c
100. c

#W 39

101. a
102. d
103. b
104. c

#W 40

105. d
106. c
107. b
108. b

#X 41

109. d
110. b
111. d
112. d

#X 42

113. b
114. b
115. c
116. c

CITRUS COUNTY BEGINNING

ELEVENTH GRADE

MATHEMATICS TEST

NAME_____

TEACHER_____

DATE_____ PERIOD_____

ANSWER SHEET

(page 1 of 2)

WRITE ANSWERS CLEARLY

#C 1

1._____
2._____
3._____
4._____

#C 2

5._____
6._____
7._____
8._____

#D 3

9._____
10._____
11._____
12._____

#E 4

13._____
14._____
15._____
16._____

#E 6

17._____
18._____
19._____
20._____

#H 7

21._____
22._____
23._____
24._____

#I 8

25._____
26._____
27._____
28._____

#J 9

29._____
30._____
31._____
32._____

#J 10

33._____
34._____
35._____
36._____

#J 11

37._____
38._____
39._____
40._____

#M 13

41._____
42._____
43._____
44._____

#M 14

45._____
46._____
47._____
48._____

#N 16

49._____
50._____
51._____
52._____

#O 17

53._____
54._____
55._____
56._____

#Q 24

57._____
58._____
59._____
60._____

#T 29

61._____
62._____
63._____
64._____

#T 30

65._____
66._____
67._____
68._____

#U 31

69._____
70._____
71._____
72._____

#U 32

73._____
74._____
75._____
76._____

#V 33

77._____
78._____
79._____
80._____

CITRUS COUNTY BEGINNING

ELEVENTH GRADE

MATHEMATICS TEST

NAME _____

TEACHER _____

DATE _____ PERIOD _____

ANSWER SHEET

(page 2 of 2)

WRITE ANSWERS CLEARLY

#V 34

81. _____

82. _____

83. _____

84. _____

#V 35

85. _____

86. _____

87. _____

88. _____

#V 36

89. _____

90. _____

91. _____

92. _____

#W 37

93. _____

94. _____

95. _____

96. _____

#W 38

97. _____

98. _____

99. _____

100. _____

#W 39

101. _____

102. _____

103. _____

104. _____

#W 40

105. _____

106. _____

107. _____

108. _____

#X 41

109. _____

110. _____

111. _____

112. _____

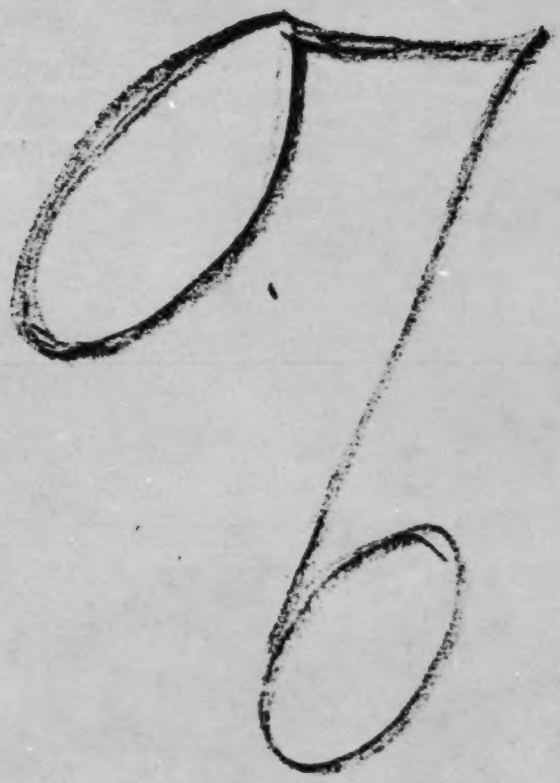
#X 42

113. _____

114. _____

115. _____

116. _____



S T A N D A R D # N

FIND PERCENTAGES

SKILL 15

Multiply a whole number and a whole number per cent less than 100.

SKILL 16

Multiply a number with no more than 2 decimal places and a whole number per cent less than 100.

#N-15 & 16

PERCENT

Students are generally unsure as to the proper procedure to follow in finding solutions to problems such as:

a. 5% of 500 = _____

b. 5% of _____ = 500

c. 5 is _____% of 500

d. _____% of 500 = 5

e. _____% of 5 = 500

f. 500% of 5 = _____

The purpose of this booklet is to develop those skills necessary to allow you to become an expert percent problem solver. In order to accomplish this goal you will need to understand several basic ideas, namely:

a. What is a percent?

b. How do you change from a percent to a decimal?

c. How do you change from a decimal to a percent?

d. How do you decide which operation to use in solving problems like those listed above:

WHAT IS PERCENT?

The word "percent" can be read "hundredths", and indicates the number of parts out of a hundred parts. The symbol for percent is "%" and may be used to replace the word "percent."

Figure 1

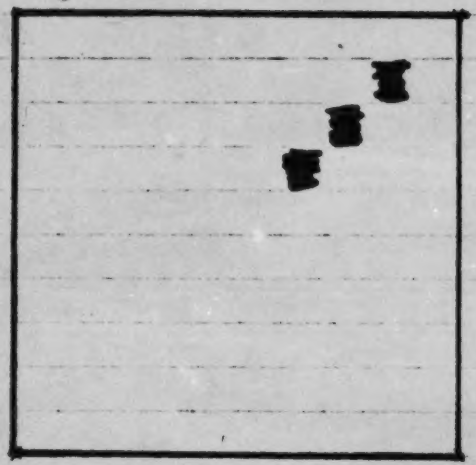


Figure 1 shows 100 small squares with 3 of the squares shaded. The 3 shaded squares represent 3 parts out of 100 parts and may be written as 3%.

Figure 2

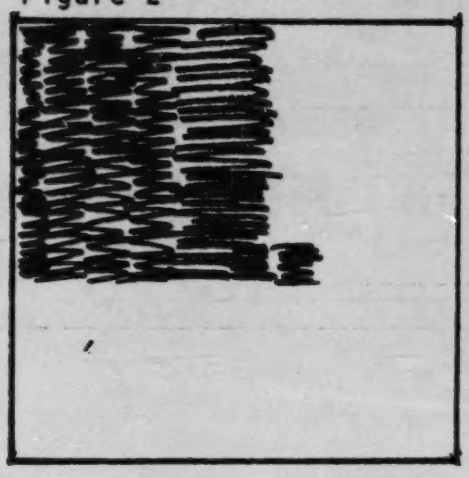


Figure 2 shows 100 small squares with 37 of the squares shaded. The 37 shaded squares represent 37 parts out of 100 parts and may be written as 37%.

Figure 3

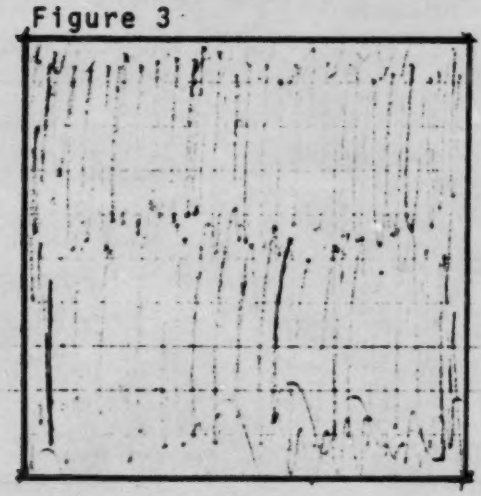


Figure 3 shows 100 small squares with 100 of the squares shaded. The 100 shaded parts represent 100 parts out of 100 parts and may be written as 100%. In this case the shaded part is the "whole thing." Therefore 100% always represents "all of something" or "the whole thing."

PERCENT LESS THAN 100% REPRESENT LESS THAN THE WHOLE

PERCENT MORE THAN 100% REPRESENT MORE THAN THE WHOLE

Let's practice a little: Take a sheet of paper and write the answers to these questions.

1. 25 out of 100 means _____%.

2. 87 out of 100 means _____%.

3. 12½ out of 100 means _____%.

4. 18 2/3 out of 100 means _____%.

5. 7 out of 100 means _____%.

The answers to these problems are at the bottom of the next page. page 4?

HOW TO CHANGE FROM PERCENT TO DECIMAL

When changing from a "%" to a "decimal", remove the percent sign and move the decimal two places to the left. We'll need some help in remembering this rule because sometimes we forget. "2 LARPS," pronounced "two-larps", is a convenient help in working percent problems. The "RPS" stands for "remove percent sign", using the first letter of each word. The "2L" means "two places to the left." The "A" stands for the word "and" and could be left out, but then we would have difficulty in pronouncing "2LRPS."

"2LARPS" means "move the decimal two places to the left and remove the percent sign." If there is no percent sign to remove than you would not use 2LARPS.

Examples: 25.1% = .251 135% = 1.35
.005% = .00005 .25% = .0024

2LARPS 2LARPS 2LARPS 2LARPS 2LARPS

Say it a few times and then practice these problems on your paper.

Change each percent to a decimal:

1. 32% = _____ 4. 56.81% = _____

2. 211% = _____ 5. 5.2% = _____

3. .002% = _____ 6. 134% = _____

The answers to these problems are at the bottom of the next page. page 4?

#N-15 & 16

HOW TO CHANGE FROM A DECIMAL TO A PERCENT

When changing from a decimal to a percent move the decimal two places to the right and add the percent sign. We often forget which way to move the decimal so here is another help to aid us in applying the rule. "2RAPS" pronounced "two-raps." The APS stands for "add percent sign", using the first letter of each word. The 2R means "two places to the right." "2RAPS" means, "move the decimal two the right and add a percent sign. If a percent sign is already present you would not use 2RAPS.

Examples: .26 = 25% 2.68 = 268%
.00045 = .045% 189 = 18900%

2RAPS 2RAPS 2RAPS 2RAPS 2RAPS

Say it a few times and then practice these problems on your paper.

Change each decimal to a percent:

1. .25 = _____%
2. 2.53 = _____%
3. .0247 = _____%
4. 22.67 = _____%
5. 234 = _____%
6. .000364 = _____%

Answers are at bottom of next page. page 57

HOW DO YOU DECIDE WHICH OPERATION TO USE IN SOLVING PERCENT PROBLEMS

Most percent problems can be put into one of the forms on the first page of this booklet, however, knowing what to do with problems in one of these forms is not too easy. Look at this problem:

_____% of 245 is 490 Do you multiply 245 by 490? Do you divide 245 by 490? Do you divide 490 by 245? Do you add 245 to 490? Do you subtract 245 from 490? Do you subtract 490 from 245? What would YOU do? I think that we need a definite procedure to ALWAYS know what to do. The following procedure will tell you just what operation to use.

ANSWERS: 1) 25 2) 87 3) 12½ 4) 18 2/3 5) 7

ANSWERS: 1) .32 2) 2.11 3) .00002 4) .5681 5) .052 6) 1.34

#N-15 & 16

Given a problem in any of the forms found on page 1, for example:

_____% of 50 = 20.

1. Draw a box beneath the blank.
2. Place a times sign (x) beneath the word "of".
3. Place an = sign under the = sign, or place an = sign under the word 'is'.
4. Place a blank under each number.

_____% of 50 = 200

☐ X __ = __

Now fill in the box and the blanks with 2 X 4 = 8

_____% of 50 = 200

☐ 2 X 4 = 8

Ask yourself, "What would I do with a "4" and an "8" (the numbers in the blanks) to get a "2", (the number in the box)? You would divide "8" by "4". You treat the numbers above "4" and "8" just like you would treat the "4" and the "8". Since you would divide the "8" by "4", you must divide the "200" by "50".

200 ÷ 50 = 4

Now we must change the answer "4" to a percent because the problem asked for a percent answer. Do you use 2RAPS or 2LARPS? Look at the last three letters. Are you adding a percent sign (APS) or removing a percent sign (RPS)? You are adding a percent sign so you should choose 2RAPS. "APS" means add a percent sigh. The "2R" tells you to move the decimal two places to the right, so we move the decimal two places to the right and add a percent sign.

4 = 400%

Example two: 25% of _____ = 500

Place a box beneath the blank
Place a blank beneath each number
Place a multiplication sign beneath "of"
Place an equal sign beneath the equal sign or beneath the word "is".

25% of _____ = 500

__ X ☐ = __

Now write in 2 x 4 = 8

25% of _____ = 500

2 X [4] = 8

(continued)

Answers:
1) 25 2) 253 3) 2.47 4)2267 5) 23400 6) .0364

What would you do with the numbers in the blanks in order to get the number in the box? You would divide 8 by 2, therefore you divide 500 by 25% to get the answer because the 500 is in the same position as the 8, and the 2 is in the same position as the 25%.

Here we recognize another problem. We do not divide or multiply with percents so we must change the 25% to a decimal. Do we use 2RAPS or 2LARPS? Look at the last three letters, are we adding a percent sign (APS) or removing a percent sign(RPS) in this problem? We are removing the percent sign so we would use 2LARPS and move the decimal two places to the left.

.25⟌500 becomes ×25, ⟌500.00, the answer is 2000

Now let us look at a different type problem.

Example three: 25 is_____% of .5

8 = [4] x 2

We have to write 8 = 4 x 2 instead of 2 x 4 = 8 because of the positions of the equal and times sign in the problem. It would not make sense to write 2 = 4 x 8 because 2 is not equal to 32. We would have to divide 8 by 2 to get the number in the box, therefore we divide 25 by .5 to get the answer.

25 divided by .5 equals 50. Now we must change 50 to a percent by using 2RAPS. 50 equals 5000%. The answer is 5000%.

Look over these examples carefully.

5% of 500 =

2 x 4 = [8]

2 x 4 = 8
5% x 500 = answer
5% = .05 (2LARPS)
.05 x 500 = answer
.05 x 500 = 25

5% of _____ = 500

2 x [?] = 8

8 ÷ 2 = 4
500 ÷ 5% = answer
5% = .05 (2LARPS)
500 ÷ .05 = answer
500 ÷ .05 = 10,000

5 is _____% of 500

8 = [4] x 2

8 ÷ 2 = 4
5 ÷ 500 = answer

.01
500⟌5.00

.01 = 1% (2RAPS)

#N-15 & 16

In the following exercises set up the problem like the example. Do not work out completely.

Example: 52% of _____ = 500

2 x [4] = 8

8 ÷ 2 = 4
500 ÷ 52% = answer

1. _____% of 12 = 156

2. 45 is 12% of _____

3. 40% of 50 = _____

4. 13½% of _____ = 200

5. _____ is 22% of 500 (answers at bottom of next page) page 8?

Here is your final example: .028% of _____ = 56

.025% of _____ = 56

2 x [4] = 8

8 ÷ 2 = 4
56 ÷ .028% = answer
.028% = .00028 (2LARPS)

.00028)15.40000 (200000 the answer is 200,000

You are on your own. Work these problems and check your answers with the answers written upside down at bottom of this page.

1. _____% of 60 = 12
2. _____ is 50% of 12
3. 50% of _____ = 12
4. 50% of 12 = _____
5. 80 is _____% of 40
6. 90 is 30% of _____
7. 7200 is _____% of 600
8. 480% of _____ = 12
9. 12 is 480% of _____
10. .006% of 50 = _____
11. 6% of _____ = 6000
12. 4% of 1200 = _____
13. 1200 is 2.4% of _____
14. 5 is _____% of 5000

1)2000 2) 6 3) 24 4) 6 5) 200% 6) 300 7) 1200% 8) 2.5

9) 2.5 10) .003 11) 8000 12) 48 13) 50,000 14) .1%

#N15 & 16

Now that we have learned the techniques for working exercises, let us proceed to word problems.

In solving word problems that involve percents, always set the problem up in one of the following forms:

2 is _____% of 50
_____% of 20 is 200
50% of _____ = 20
20% of 50 = _____ etc.

Most percent problems can be placed in one of these forms rather handily. Do not try to use a particular form every time. Let the word arrangement in the problem lead you to the form you choose.

Any form will work using the techniques developed in the preceding pages.

Example 1: A team played 80 games and won 60 of them. What percent of the games played did they win?

_____% of 80 = 60

[2] x 4 = 8 (you complete)

Example 2.

Mr. Smith has an all-electric house that did not have attic insulation. His heating cost last year was $600. During the summer he installed attic insulation and was told his heating cost would decrease 40%. How much would he have saved last year if he had had attic insulation then?

40% of $600 = _____

2 x 4 = [8] (you complete)

Example 3.

A chemical processing plant that now uses 600 barrels of oil a day has agreed with the Federal Energy Commission to reduce this amount by 7.8% by 1980. When they do, how many barrels of oil will they save each day.

7.8% of 600 = _____ (you complete)

(continued)

to Page 7

Answers: 1) 156÷12 2) 45÷ 12% 3) 40% x 50 4) 200÷13½
5) 22% x 500

Example 4.

A steel company used 20,000 barrels of oil each day in 1978. By remodeling equipment, they now use 17,500 barrels of oil a day. What percent of the 1978 amount will they save each day in 1979?

2,500 is ____ % of 20,000 (you complete)

Example 5.

John's Camaro gets 20 miles per gallon when not using the air-conditioner. With the air-conditioner operating he gets 18 m.p.g. What % of fuel is he saving by not using his air-conditioner?

2 is ____ % of 20. (you complete)

The following problems will give you practice in solving word problems using percents and will also contain ideas indicating ways to conserve energy. Please pay attention to these energy saving ideas so that you can do your part to keep America moving.

ENERGY RELATED PERCENT PROBLEMS

1. You can improve your car mileage by 20% if you drive 50 miles per hour instead of 75 m.p.h.

   If you average 15 miles per gallon at 75 m.p.h., how much would you average at 50 m.p.h.?

2. In January of 1977 John used 1250 kilowatt hours (KWH) to heat his house. In June of 1977 he added insulation to his attic. In January of 1978 he used 1000 KWH to heat his house:

   a) How many KWH did he save in January 1978 compared to January 1977?

   b) This saving is what percent of the KWH used in January, 1977?

3. A color TV consumes 33% more energy than a black and white set. If the b&w set used 1500 kilowatt hours over a certain period of time, how many kwh would the color set use in the same period of time?

4. If a 100 watt light bulb is replaced by a 75 watt bulb, what percent of the 100 watts would be saved?

5. A defrosted roast requires 33% less cooking time than a roast that is still frozen. If it takes two hours to cook a frozen roast, how long would it take to cook a defrosted roast of the same size?

6. Heat loss through windows can be reduced up to 16% by covering windows with heavy drapes. Last year Pete figured his heat loss cost him $200. This year he installed heavy drapes over his windows. What is the largest amount of money he can expect to save this year because he installed heavy drapes?

7. Water heater thermostats should be set as low as practical. For every 10^{o}F you raise the temperature above 140^{o}F, your hot water cost will increase 3%.

   a) If you set the thermostat at 170^{o}, by what percent will your hot water cost increase?

   b) If your water heating bill is normally $20 per month and you increase your thermostat from 140^{o}F to 160^{o}F, how much more money would you pay each month?

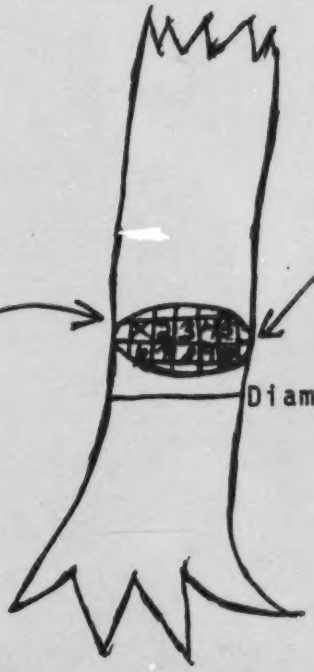
8. If you set your washing machine to use cold water only, you can save 4% on your water heating bill. If your water heating bill is normally $30 per month, how much money could you save by switching to cold water only for your washing machine?

9. Every time you open the oven door the oven temperature drops 25-50%. If the oven temperature is 200^{o} and you open the door briefly, what is the least amount the temperature will drop?

10. John found that after he had weather-stripped his doors and windows his heating bill decreased 12%. If his heating bill had previously been $850 per year, how much could he now expect to save each year?

Figuring the Basic Value of the Tree

The Basic Value of a tree is set at $15 for each square inch of cross-section of it's trunk. Look at the tree trunk below.



Numbers 2-10 indicate ten square inches of cross-section. The partial squares could be added together to make approximately 9 additional squares or a total of 19 square inches. If each square inch is worth $15, then 19 x $15 = $285 = the Basic Value of the tree.

If your tree is 13 inches in diameter, then, using the chart on Basic Value on the upper right corner of the next page, the cross-sectional area is 132.7 square inches and the Basic Value is 132.7 x $15 = $1990.50.

1. What would be the approximate Basic Value of a tree that was 16 inches across (diameter=16") - see Chart I.

   a) $3000 b) $300 c) 200 square inches d) 16 square inches

b. Using the species ratings on the chart, what would be the species value of a Live Oak that has a basic value of $4000? The % rating for live oak trees=100% (chart II).

   Answer: 100% of $4000 =
   1.00 x $4000 = $4000

2. What would be the species value of a Turkey Oak that has a basic value of $1000 be worth? (See chart II)

   a) $4000 b) $400 c) $200 d) $2000

3. Using the condition/life expectancy ratings on the chart, what would a Live Oak tree with the species value of $2000 and a life expectancy of 50 more years be worth? (See chart III)

   a) $900 - $1000
   b) $1800 - $2000
   c) $2700 - $3000
   d) $3600 - $4000

4. Using the location ratings on the chart, what would a Live Oak tree with a condition/life expectancy value of $2000 and located along a rural highway be worth? (See chart IV)

   a) $4000 - $5000
   b) $2000 - $3000
   c) $1000 - $1500
   d) $800 - $1200

Did you know that a live oak tree with a two foot diameter trunk and a life expectancy of over 30 years located on your property in a feature spot in your community if destroyed by lightning may be considered a deductible loss of $6,786.00 by the Internal Revenue Service? How do you figure that? Look at the following formula:

The Basic Value of the tree times the Species Classification times the Tree's Location = Total Value of the Tree

#N-15 & 16

CHART II

SPECIES	% RATING
Ash	40%
Cypress	90%
Bay	40%
Catalpa	20%
Cedar	60%
Chinaberry	20%
Dogwood	60%
Elm	40%
Gum	40%
Hickory	80%
Holley	60%
Laurel Cherry	40%
Magnolia	40%
Maple	80%
Oak, Laurel	40%
Oak, Live	100%
Oak, Chestnut	80%
Oak, Turkey	20%
Oak, Water	20%
Persimmon	40%
Pine, Longleaf	80%
Pine, Loblolly	80%
Pine, Slash	80%
Sweet Gum	60%
Walnut, [redacted]	80%
Willow	20%
All Palms	60%

CHART I

BASIC VALUE $15 PER SQUARE INCH

Trunk diameter inches - 4½'	Cross-sectional area (sq. inch)
13	[redacted]32.7
14	153.9
15	176.7
16	201.1
17	227.0
18	254.5
19	283.5
20	314.2
21	346.4
22	380.1
23	415.5
24	452.4
25	490.9
26	530.9
27	572.6
28	615.8
29	660.5
30	706.9
31	754.8
32	804.3
33	855.3
34	907.9
35	962.1
36	1,017.9
37	1,075.2
38	1,134.1
39	1,194.6
40	1,256.6

CHART III

CONDITION	LIFE EXPECTANCY YEARS FROM INSPECTION	% RATING
Excellent	over 30	90-100%
Good	20 - 30	80-90%
Fair to Good	15 - 20	60-80%
Fair	10 - 15	40-60%
Poor to Fair	5 - 10	20-40%
Poor	0 - 5	0-20%

CHART IV

LOCATION	% RATING
Feature/Historical trees	90-100%
Average residential/Landscape trees	80-90%
Mall/Public area trees	70-80%
Arboretum/Park trees	60-80%
City Streets trees	60-80%
Screen/Windbreak trees	60-70%
General recreation/Picnic area trees	60-70%
Industrial area trees	50-70%
Rural area highway trees	40-60%
Rural open woods trees	30-40%
Forest trees	10-20%

Basic Value X Species Classification X Condition X Location = Value of the tree.

Citrus 78 percents

#N-15 & 16

TRUNK DIAMETERS AND AREA OF TRUNK CROSS-SECTIONS

Circumference in Feet	Trunk Diameter Inches	Cross-Section Area Sq. Inches	Circumference in Feet	Trunk Diameter Inches	Cross-Section Area Sq. Inches
.5	2	3.14	8.1	31	754.8
.8	3	7.07	8.4	32	804.3
1.0	4	12.57	8.6	33	855.3
1.3	5	19.64	8.9	34	907.9
1.6	6	28.27	9.2	35	962.1
1.8	7	38.49	9.4	36	1017.9
2.1	8	50.27	9.7	37	1075.2
2.4	9	63.62	10.0	38	1134.1
2.6	10	78.5	10.2	39	1194.6
2.9	11	95.0	10.5	40	1256.6
3.0	12	113.1	10.7	41	1320.3
3.4	13	132.7	11.0	42	1385.4
3.7	14	153.9	11.3	43	1452.2
3.9	15	176.7	11.5	44	1520.5
4.2	16	201.1	11.8	45	1590.4
4.5	17	227.0	12.0	46	1661.9
4.7	18	254.5	12.3	47	1734.9
5.0	19	283.5	12.6	48	1809.6
5.2	20	314.2	12.8	49	1885.7
5.5	21	346.4	13.1	50	1963.5
5.8	22	380.1	13.3	51	2042.8
6.0	23	415.5	13.6	52	2123.7
6.3	24	452.4	13.9	53	2206.2
6.5	25	490.9	14.1	54	2290.2
6.8	26	530.9	14.4	55	2375.8
7.1	27	572.6	14.7	56	2463.0
7.3	28	615.8	14.9	57	2551.8
7.6	29	660.5	15.2	58	2642.1
7.9	30	706.9	15.4	59	2734.0
			15.7	60	2827.4

#N-15 & 16

Condition Value of Trees

To obtain Condition Values, add the numbers in Section A that represent your tree. Then add the numbers in Section B that represent your tree. Now subtract the Section B answer from the Section A answer. Finally, subtract this answer from 100% to obtain the Condition Value.

Section A.

40% - Low Property Values

10% - Nearby non-living eyesores (rundown buildings, wires, telephone poles, etc.)

Tree's Appearance:

25% Dead and broken limbs and branches

15% Damaged trunk

20% Insect and disease damage

15% Trimming scars

10% Fire damage

25% Few branches

If nothing in Section A applies, then the tree Condition Value is automatically 100%.

Section B.

5% Has beautiful flowers

10% Is a permanent part of landscape (part of courts, patios, etc.)

25% Historical significance

25% Rare type of tree

10% Adds unusual scenery to landscape (reflection in pools, shades walkways, etc.)

METHODS FOR DETERMINING DIAMETER OF A TREE

Instructional Procedures and Activities

Allow pupils to work in couples or small groups with each pupil having the opportunity to measure the tree while another records data and assists. Ask them to determine the diameter of a tree at a point 4 1/2 feet above the ground using either or both of the following methods.

Method #1 - Diameter Tape

Cut a piece of heavy paper or flexible cardboard at least 1 1/2 inches wide and about 60 inches long. Starting at one end of this measuring tool, mark off units3.14 inches apart (approximately 3 3/16 inches) and number these units consecutively. Wrap tape around tree at 4 1/2 ft. point. Read diameter directly from the tape.
Before pupils actually use the tape outdoors, allow time for classroom discussion on waste baskets and round objects.Discuss results and compare measurements with those obtained using basic mathematical formulae. Be sure pupils understand why the tape measurements are accurate and the underlying mathematical concept.

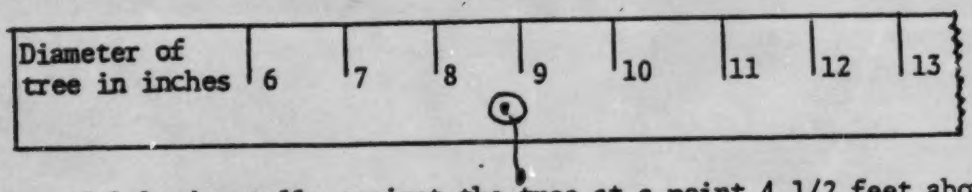
Method # 2

To make a Biltmore stick diameter scale apply a piece of masking tape to a yardstick or meter stick. Using a ruler mark off the numbers shown in diagram below starting at the left end of the masking tape.

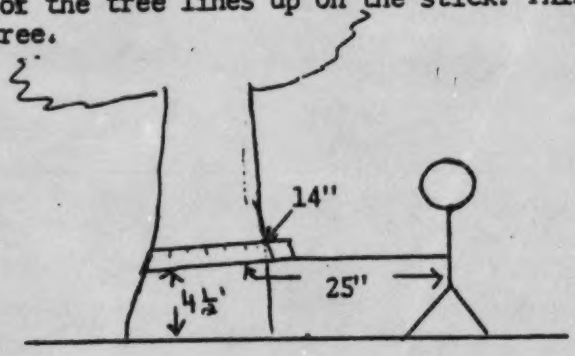
Biltmore Stick Scale

Ruler Mark	Tree Diameter
5 7/16"	6"
6 3/16"	7"
7"	8"
7 13/16"	9"
8 1/2"	10"
9 1/4	11"
9 15/16"	12"
10 9/16	13"
11 5/16"	14"
11 15/16"	15"
12 9/16"	16"
13 3/16"	17"
13 15/16"	18"
15"	20"
16 3/16"	22"
17 5/16"	24"
18 6/16"	26"
19 6/16"	28"
20 7/16"	30"

If you wish, you can varnish the making tape to make it water proof. Drill a hole through the center of the stick and insert a leather thong or piece of heavy twine. Knot both ends so that the distance between knots is 25 inches. Your completed diameter scale should look like:

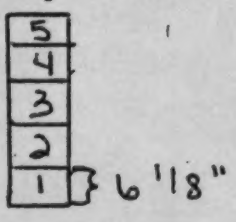


Hold the stick horizontally against the tree at a point 4 1/2 feet above ground level. Using the knotted cord as a measure, have pupils sight with the eye 25 inches away from the tree. Holding the head steady, have them line up the left end of the stick with the left side of the tree and note where the right side of the tree lines up on the stick. This number indicates the diameter of the tree.

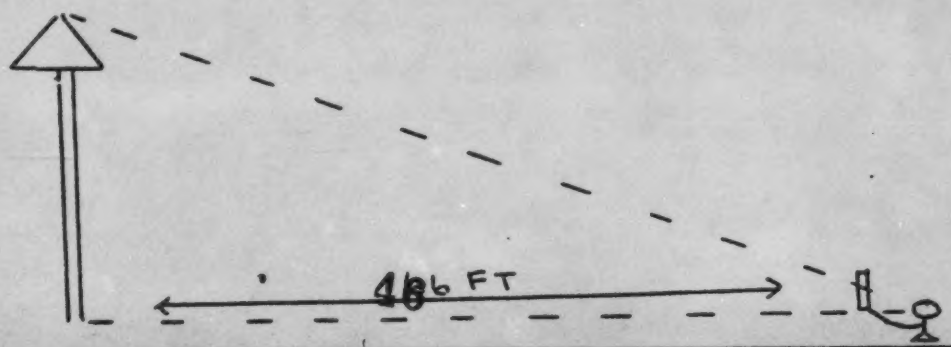


METHOD FOR DETERMINING TREE HEIGHT OR NUMBER OF 16 FOOT LOGS USING BILTMORE STICK

To make a Biltmore stick tree height or number of 16 foot logs scale use the stick constructed in method #2 for determining diameter. On one edge of the stick mark off sections 6 1/8 inches apart bottom to top. Number these consecutively from bottom to top as below.



To use the Biltmore stick:
Measure 66 ft. from the base of the tree or object to be measured. From this position hold the stick in a vertical position with vertical numbers facing person doing the measurement, about 25 inches from the eye. Sight along bottom of stick to base of tree or object. Without moving the head (move eyes) sight to the top of the tree or object noting where line of sight crossed stick.



This point indicates the number of 16 ft. sections in the tree. Multiply number of sections by 16 ft. to obtain height. When figuring board feet of lumber in the tree use a point near the top where the diameter is about 8 inches. (Top cannot be used for lumber)
Use the board feet in a tree activity provided to determine the board feet in a tree. Determine cost per board foot in the local area to find dollar worth of the tree.

Board Feet in a Tree

Take your class out on campus and determine the number of board feet of wood contained in campus trees. Determine the height of the tree from the ground to a point near the top where the tree is about 8 inches in diameter. (There are several exercises in this booklet that deal with estimating tree height). Determine the diameter of the tree trunk four and one half feet above the ground (Diameter Breast Height). Next, determine the number of logs in the tree. A log is a section of the tree that is 16 feet long. Trees are cut into logs in order to haul them to the saw mill. To find the number of logs, divide the height of the tree by 16 feet. Finally, put your data into the chart to obtain the number of board feet. Ramamber, a board foot is a board 12 inches long by 12 onches wide by 1 inch thick.

Diameter in inches	Number of 16' logs: 1	2	3	4	5	6	7	8
8	25							
9	30							
10	40	65						
11	50	85						
12	62	80	133	183	235	286		
14	64	88	147	210	274	338		
16	67	96	163	242	320	399		
18	71	109	190	280	370	459	550	701
20	75	123	221	330	435	543	651	758
22			258	383	509	633	760	884
24				438	584	728	882	1035
26					666	832	1013	1190
28					750	941	1114	1346
30					850	1062	1291	1518
32						1195	1149	1700
34						1333	1614	1898
36						1494	1782	2095
38							1955	2305
40							2150	2523

AVERAGE PRICES FOR STUMPAGE (STANDING TIMBER)

North Florida		Per 1000 BD Feet	Cord
Pine		$100-$150	$20-$25
Cypress	(old)	$200-$400	
	(new)	$100-$150	
Hardwoods (Oak, Gum, Ash)		$ 50-$ 75	
South Florida			
Pine		$ 85-$100	$15-$17
Cypress	(old)	$200-$400	
	(new)	$100-$150	
Hardwoods (Oak, Gum, Ash)		$ 40-$ 50	

ESTIMATING FISH POPULATION

Seine the shoreline area of the lake. After each seine haul, place the captured fish in buckets or holding pen. When seine hauls no longer produce fish, discontinue the capturing. Examine the captured fish. The different species may be separated. Count each individual of a species of fish-record the data accordingly.

	Number Captured
Fish species (common name) _____	
Fish species (common name) _____	
Fish species (common name) _____	

Mark each fish by fin clipping. Return all of the marked fish back to the water. Wait one to several days then repeat the seining activity. Again place the captured fish in buckets or holding pen. Separate the species if this was done before. Record the number of new captures and the number of marked fish that were recaptured.

	Number Captured	
	New	Marked
Fish species (common name) _____		
Fish species (common name) _____		
Fish species (common name) _____		

To estimate the populations use the following formula and cross multiply:

$$\frac{\text{Population Estimate}}{\text{Total Number of Fish Captured On Day One}} = \frac{\text{Total Number of Fish Captured On Day Two}}{\text{Number of Marked Fish Recaptured}}$$

If you are estimating separate species, then use the data collected for each species in the formula.

Which species is most abundant? _____

_____

_____

Why is one species more abundant than others? _____

_____

_____

What problems can you think of which could affect this estimating technique?

_____

_____

_____

_____

_____

#N-15 & 16

ANSWER KEY

PERCENTAGES

Examples on page 8

1) 75%
2) $240
3) 46.8

Examples on Page 9

4) 12½%
5) 10%

Page 9

1) 18
2) a. 250kwh
   b. 20%
3) 2000kwh
4) 25%

Page 10

5) 1.34 hours or
   80.4 minutes
6) $32
7) a. 9%
   b. $1.20
8) $1.20
9) 50
10) $92.00

Page 12

1) a. $3000
2) c. $200
3) b. $1800-2000
4. d. $800-1200

Elapsed Time

S T A N D A R D # 0

Measure time, temperature, distance, capacity, and weight

SKILL 17

Determine the elapsed time between two events stated in seconds, minutes, hours, days, weeks, months, or years

#0-17

ELAPSED TIME

1 minute = 60 seconds
1 hour = 60 minutes
1 day = 24 hours
1 week = 7 days
1 year = 12 months

April, June, September & November = 30 days

January, March, May, July, August, October & December = 31 days

February = 28 days or 29 days during leap year

Example:
Find the elapsed time from
5 AM Monday to 3 PM Thursday:

24
-5
19 hours remaining in Monday
24 hours Tuesday
24 hours Wednesday
+ 15 hours elapsed Thursday
82 hours total elapsed time

There are varying estimates as to exactly when our oil and gas will run out. The world is consuming petrolium today at the rate of 18 billion barrels per year, (about 6 billion of it by the United States). The world's total reserves are not known today since large oil fields are still being found. It takes a great deal of time to extract the oil from the ground.

1. A well is begun and a pipeline is needed. The men work from 7AM to 4PM with an hour off for lunch. How many working hours will it take to complete if the line is begun on Tuesday at 11AM and finished Friday of the same week at 2PM?

2. Production on a well started on August 1, 1964. The well should be productive until February 1, 1987. How many years and months will the well produce?

3. On June 10, 1978 the Sun Oil Company began drilling a new oil well. September 23, 1978 the well was completed. How many weeks did it take to drill the well?

4. When the well was connected to a storage tank it was ready for production. At 9AM the pump was started; at 4PM the tank was filled. How many hours did it take to fill the tank?

5. When the oil reaches a refinery it is broken down into several products - butane, gasoline, diesel, lubricating oil and asphalt. Between 7:32AM and 8:17AM the refinery can produce 11,000 gallons of gasoline. How many minutes does it take to produce this amount?

#Q-17

ANSWER KEY

ELAPSED TIME

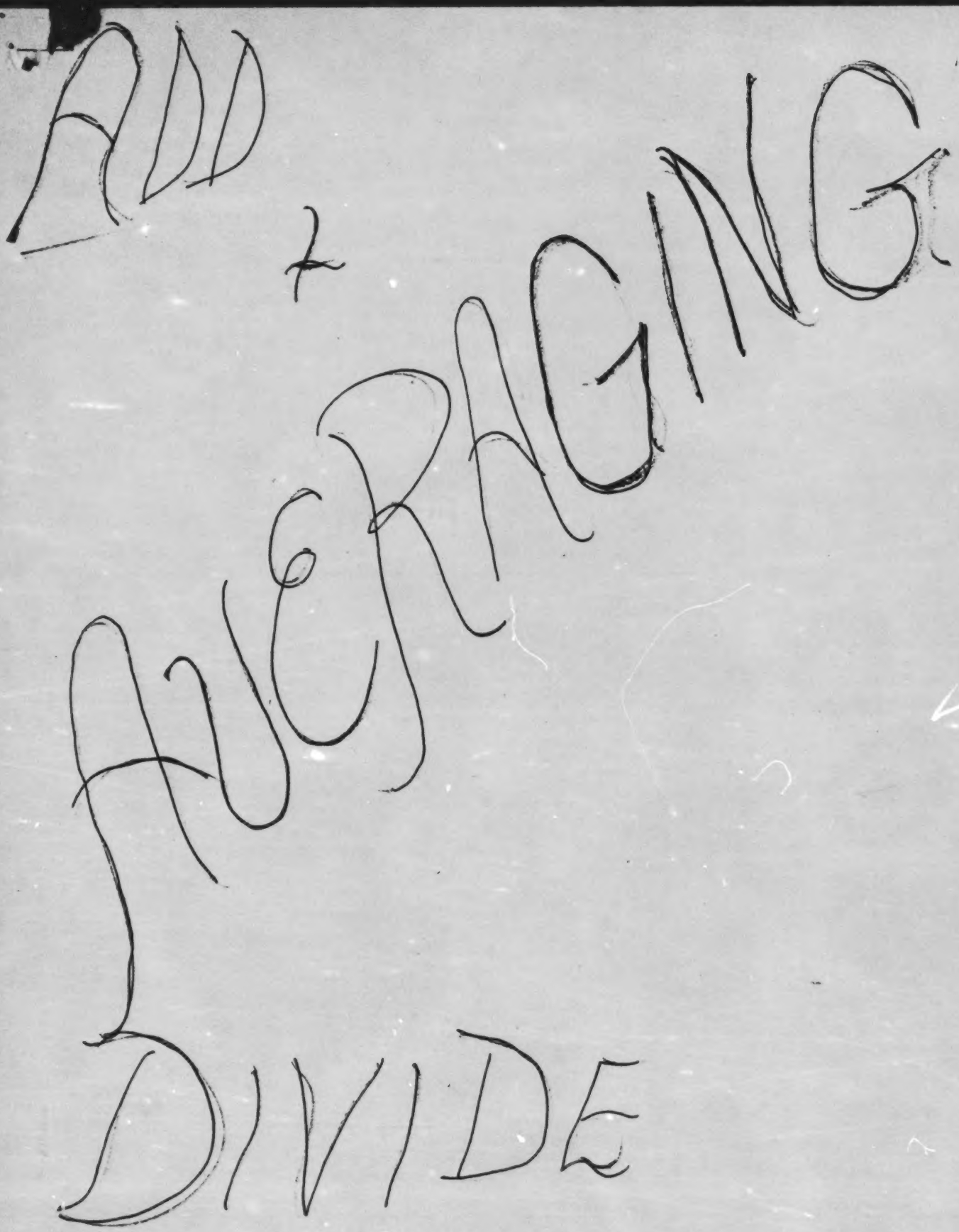
1) 26 hours

2) 22 yr. 6 mo.

3) 15 weeks

4) 7 hours

5) 45 minutes


ADD
+
AVERAGING
DIVIDE

S T A N D A R D # T

Solve real-world problems involving whole numbers

SKILL 29

Solve real-world problems involving averages of no more than ten numbers and no more than two distinct whole number operations.

#T-29

To the Student:

This booklet is designed to teach you the skill of "averaging"; to find the average of two or more numbers.

Average may be defined as: the sum of the values listed divided by the number of values listed.

For example: There are three Florida Counties that are improving and building Water Systems. It will cost Brevard County $69,000, Broward $179,000, and Dade County $805,000. What is the average cost for these three counties to improve and build water systems?

To find the average, first you add the values (cost in this case) for the counties to be considered.

Brevard------$ 69,000
Broward------ 179,000 } Values (or cost)
Dade--------- 805,000
$1,053,000 sum of values listed

The second step in finding the average is to divide the sum ($1,053,000) by the number of values listed (3 counties).

$351,000 ⟵ Average cost
(No. of counties) ⟶ 3/$1,053,000 ⟵ Sum or total cost for counties
-9
15
-15
3
-3
0

The average cost for improving and building Water Systems for these counties is $351,000. There are two steps in finding the average.

1st Add the Values to get the Sum

2nd Divide the Sum by the Number of Values.

It is important to remember that the value listed is not always money. The example below uses oranges as the values listed.

2nd Example: In the month of January Winn Dixie sold 600 dozen oranges. In March 300 dozen were sold, April 200 dozen, and June only 60 dozen oranges were sold. What is the average number of dozens of oranges sold for these months?

1st step: Add the values to get the sum.

January----600 dozen oranges
March------300 dozen oranges } ---Values Listed
April------200 dozen oranges
June------- 60 dozen oranges
Sum of values listed 1160 dozen oranges

(continued)

2nd step: Divide the sum by the number of values.

No. of months oranges sold → 4/1160 ← Sum or total oranges sold

290 ← Average no. sold

-8
36
-36
0

The average number of oranges sold for these months is 290 dozen.

Now, let's see how well you can do on your own.

The table below indicates the approximate amount of water used for some everyday house-hold activities.

Activities	Gallons of water
Dishwasher	12
Washing dishes by hand	3
Flushing a toilet	3
A shower bath	25
A tub bath	35
Washing machine	25

What is the average number of gallons of water used for the following combinations:

1. Washing dishes by hand, a shower bath, a tub bath.
   a) 21 b) 22 c) 23 d) 24

2. Washing machine, a shower bath, dishwashing machine, flushing a toilet, a tub bath.
   a) 17. b) 18 c) 19 d) 20

3. Dishwasher, tub bath, and washing machine.
   a) 22 b) 24 c) 18 d) 19

#T-29

The following table gives the amount of energy that a typical home can consume per month in energy.

Appliance	Kilowatt-Hour(KWH)
Range	100
Electric Heat	1100
Water Heater	315
Refrigerator (manual)	100
Refrigerator (frost-free)	205
Lights & small appliances	185
Window air conditioner	180
Color TV	42

Directions: Use the table above to answer the following:

What is the <u>average</u> amount of KWH used in the following situations per month?

4. Water heater, lights and small appliances.
   a) 249kwh b) 250kwh c) 251kwh d) 252kwh

5. Electric heat, range, water heater, lights and small appliances.
   a) 423kwh b) 424kwh c) 425kwh d) 426kwh

6. Electric heat, range, refrigerator(manual), water heater, color TV, lights and small appliances.
   a) 307kwh b) 308kwh c) 309kwh d) 310kwh

7. Electric heat, range, water heater.
   1) 504kwh b) 505kwh c) 506kwh d) 507kwh

#T-29

The following table shows the estimated cost for improving and building new sewer systems in the state of Florida.

County	Cost in Millions of Dollars
Brevard	$ 69
Broward	$179
Dade	$805
Duval	$ 94
Hillsborough	$187
Leon	$ 15
Orange	$100
Palm Beach	$104
Pinellas	$ 87
Polk	$ 88
Seminole	$ 57

Directions: Use the information given in the above table and answer the following questions.

Find the <u>average</u> cost for improving and building sewer systems for the following counties:

8. Leon, Orange, Palm Beach, Seminole
   a) $68 million b) $69 million c) $70 million d) $71 million

9. Broward, Duval, Hillsborough, Orange, Leon.
   a) $112 million b) $113 million c) $114 million d) $115 million

10. Broward, Dade, Duval, Hillsborough, Leon, Orange, Palm Beach, Pinellas, Polk, Seminole.
    a) $170 million b) $171 million c) $172 million d) $173 million

#T-29

ANSWER KEY

AVERAGES

Page 2

1) a. 21 gallons
2) d. 20 gallons
3) b. 24 gallons

Page 3

4) b. 250 kwh
5) c. 425 kwh
6) a. 307 kwh
7) b. 505 kwh

Page 4

8) b. $69 million
9) d. $115 million
10) b. $171 million

U-31

Real-World Problems

24 .36 9%

S T A N D A R D # U

Solve Real-World Problems Involving Fractions, Decimals, and Percents

SKILL 31

Solve real-world problems involving addition or subtraction of proper fractions with unlike denominators of 2, 3, 4, 5, 6, 8, or 10.

#U-31

HOW TO ADD OR SUBTRACT PROPER FRACTIONS WITH UNLIKE DENOMINATORS

Numerator - the top number of a fraction.

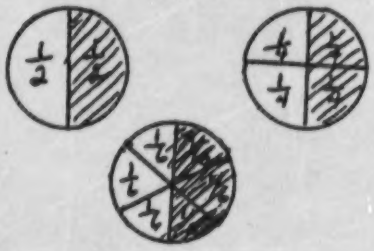
Denominator - the bottom number of a fraction.

Example: $\frac{2}{3}$ (numerator: 2; denominator: 3)

Equivalent fractions - The numerator and the denominator of a fraction may be multiplied by the same number, and the new fraction will still be equal to the original fraction.

Example: $\frac{1}{2} = \frac{1 \times 2}{2 \times 2} = \frac{2}{4}$

$\frac{1}{2} = \frac{1 \times 3}{2 \times 3} = \frac{3}{6}$



So, $\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10} = \frac{6}{12}$ .....

RULE: Fractions must have like denominators to be added.

Example: If the denominators are <u>alike</u>, add the numerators, and the new denominator stays the same.

$$\begin{array}{r} \frac{3}{7} \\ +\frac{2}{7} \\ \hline \boxed{\frac{5}{7}} \end{array}$$

Example: If the denominators are <u>unlike</u>, use what you know about equivalent fractions to make the denominators alike.

$$\begin{array}{r} \frac{3}{8} \\ +\frac{1}{4} \\ \hline \end{array}$$

Find a number that both denominators will divide into evenly. How about 8, or 16, or 24,...

Any of these will work as a common denominator, but the Least (smallest) Common Denominator or LCD is the best choice because it will lessen the reducing to be done later. So 8 is our LCD.

$$\begin{array}{rl} \frac{3}{8} & = \frac{\quad}{\quad} = \frac{\quad}{8} \\ +\frac{1}{4} & = \frac{\quad}{\quad} = \frac{\quad}{8} \\ \hline \end{array}$$

$$\begin{array}{rl} \frac{3}{8} & = \frac{3 \times 1}{8 \times 1} = \frac{3}{8} \\ +\frac{1}{4} & = \frac{1 \times 2}{4 \times 2} = +\frac{2}{8} \\ \hline & \boxed{\frac{5}{8}} \end{array}$$

After making the denominators alike, add the numerators, and the denominator stays the same.

Citrus 78
r/w

RULE: Fractions must have like denominators to be subtracted.

Example: If the denominators are alike, subtract the numerators, and the new denominators stays the same.

$$\begin{array}{r} \frac{7}{9} \\ -\frac{5}{9} \\ \hline \boxed{\frac{2}{9}} \end{array}$$

Example: If the denominators are unlike, use what you know about equivalent fractions to make the denominators equal.

$$\frac{5}{6} = \frac{\quad}{\quad} = \frac{\quad}{6}$$
$$-\frac{1}{3} = \frac{\quad}{\quad} = \frac{\quad}{6}$$

Find a number that both denominators will divide into evenly.
How about 6, or 12, or 18, ...

Any of these will work as a common denominator, but the Least (smallest) Common Denominator or LCD is the best choice because it will lessen the reducing to be done later.

$$\frac{5}{6} = \frac{5 \times 1}{6 \times 1} = \frac{5}{6}$$
$$-\frac{1}{3} = \frac{1 \times 2}{3 \times 2} = \frac{2}{6}$$
$$\frac{3}{6}$$

So 6 is our LCD.

After making the denominators alike, subtract the numerators, and the new denominator stays the same.

Now, reduce $\frac{3}{6}$ .....

REDUCING: The numerator and the denominator of a fraction may be multiplied by the same number to make an equivalent fraction in higher terms.

Similarly, the numerator and denominator of a fraction may be divided by the same number to make an equivalent fraction in lower terms.

$$\frac{3\overline{)3}}{3\overline{)6}} = \frac{1}{2} = \frac{1}{2}$$

If a number can be divided evenly into the numerator and denominator of a fraction, it can be reduced. Reduce all fractions until the only number that will divide evenly into the numerator and denominator is a 1.

$$\frac{4\overline{)8}}{4\overline{)12}} = \frac{2}{3} = \frac{2}{3}$$

In all the above examples on reducing, the numerators are smaller than the denominators. To reduce a fraction in which the numerator is larger than the denominator, divide the numerator by the denominator. If there is a remainder, make a fraction by placing the remainder in the numerator of the fraction and the divisor in the denominator of the fraction.

$$\frac{7}{6} = 6\overline{)7} = 1\frac{1}{6}$$

#U-31

Directions: Fill in the blanks by using what you know about equivalent fractions. Example: $\frac{3}{4} = \frac{3 \times 2}{4 \times 2} = \frac{6}{8}$

① $\frac{1}{2} = \frac{}{4}$ ④ $\frac{3}{5} = \frac{}{10}$ ⑦ $\frac{4}{7} = \frac{}{21}$

② $\frac{2}{3} = \frac{}{6}$ ⑤ $\frac{7}{9} = \frac{}{18}$ ⑧ $\frac{5}{6} = \frac{}{30}$

③ $\frac{3}{4} = \frac{}{12}$ ⑥ $\frac{3}{16} = \frac{}{32}$ ⑨ $\frac{5}{8} = \frac{}{40}$

Directions: Reduce the following fractions that have numerators smaller than the denominators.
Example: $\frac{20}{30} = \frac{2\overline{)20}}{2\overline{)30}} = \frac{10}{15} = \frac{5\overline{)10}}{5\overline{)15}} = \frac{1\overline{)2}}{1\overline{)3}} = \frac{2}{3}$

① $\frac{6}{8} =$ ④ $\frac{14}{21} =$ ⑦ $\frac{8}{10} =$

② $\frac{5}{15} =$ ⑤ $\frac{18}{32} =$ ⑧ $\frac{4}{6} =$

③ $\frac{12}{18} =$ ⑥ $\frac{22}{48} =$ ⑨ $\frac{6}{10} =$

Directions: Reduce the following fractions that have numerators larger than the denominators.
Example: $\frac{8}{6} = 6\overline{)8}^{1\frac{2}{6}} = 1\frac{1}{3}$ (remainder $\frac{6}{2}$)

① $\frac{9}{3} =$ ④ $\frac{12}{3} =$ ⑦ $\frac{22}{10} =$

② $\frac{10}{3} =$ ⑤ $\frac{17}{8} =$ ⑧ $\frac{36}{8} =$

③ $\frac{11}{3} =$ ⑥ $\frac{20}{4} =$ ⑨ $\frac{40}{6} =$

r/w
Citrus 78

#U-31

Directions: Add the following fraction problems remembering to make the denominators alike by using what you know about equivalent fractions. Reduce all answers.

① $\frac{1}{2} + \frac{3}{8}$ = _____

② $\frac{2}{3} + \frac{3}{4}$ = _____

③ $\frac{1}{3} + \frac{5}{6}$ = _____

④ $\frac{4}{5} + \frac{2}{3}$ = _____

⑤ $\frac{3}{4} + \frac{1}{4}$ = _____

⑥ $\frac{5}{6} + \frac{3}{4}$ = _____

⑦ $\frac{3}{8} + \frac{2}{3}$ = _____

⑧ $\frac{1}{4} + \frac{3}{5}$ = _____

⑨ $\frac{3}{10} + \frac{3}{4}$ = _____

⑩ $\frac{7}{10} + \frac{1}{6}$ = _____

⑪ $\frac{5}{8} + \frac{5}{6}$ = _____

⑫ $\frac{4}{5} + \frac{3}{8}$ = _____

Directions: Subtract the following fraction problems remembering to make the denominators alike by using what you know about equivalent fractions. Reduce all answers.

① $\frac{4}{5} - \frac{3}{4}$ = _____

② $\frac{3}{4} - \frac{2}{3}$ = _____

③ $\frac{5}{6} - \frac{1}{3}$ = _____

④ $\frac{4}{5} - \frac{2}{3}$ = _____

⑤ $\frac{3}{4} - \frac{3}{10}$ = _____

⑥ $\frac{5}{6} - \frac{5}{8}$ = _____

⑦ $\frac{3}{5} - \frac{1}{4}$ = _____

⑧ $\frac{2}{3} - \frac{3}{8}$ = _____

⑨ $\frac{5}{6} - \frac{3}{4}$ = _____

⑩ $\frac{4}{5} - \frac{3}{8}$ = _____

⑪ $\frac{1}{2} - \frac{3}{8}$ = _____

⑫ $\frac{7}{10} - \frac{1}{6}$ = _____

r/w
Citrus 78

#U-31

AUTOMOBILE SELECTION AND ENERGY: The most significant variable affecting fuel consumption in an automobile is its weight. A car weighing 5000 pounds uses more than twice as much fuel as one weighing 2000 pounds. Do you really need those bar-bells in your trunk. How about that rock collection in your back seat? Remove all but essentail safety gear from your trunk. That outboard motor really doesn't belong there anyway. Excess baggage costs you a 1% increase in gasoline cost for each 50 pounds. Also, an air conditioner typically increases average fuel consumption by 9% and by as much as 20% when operated in stop-and-go traffic on a hot day.

DIRECTIONS: Answer each of the following questions adding or subtracting the fractions as needed and noting that increased weight in a car increases fuel consumption.

1. Suppose pulling a U-Haul trailer, a car uses $\frac{2}{3}$ of a tank of gas to drive 160 miles. The U-Haul trailer and contents are left at the destination. So on the return trip the car only uses $\frac{1}{2}$ tank of gas. How much more gas was consumed on the way to the destination than on the return trip?

   a) $1\frac{1}{6}$ b) $\frac{1}{6}$ c) $\frac{3}{5}$ d) $\frac{1}{5}$

2. Suppose a mail truck with a load of mail uses $\frac{7}{8}$ tank of gas to travel its 89 mile route, but unloaded it takes only $\frac{5}{8}$ of a tank to travel 89 miles. What is the difference in gasoline used?

   a) $1\frac{3}{8}$ b) $\frac{2}{3}$ c) $\frac{1}{8}$ d) $\frac{1}{16}$

3. If a truck driver has $\frac{3}{8}$ of a tank of gasoline and he fills the tank up to $\frac{3}{4}$ of a tank, How much gasoline did he put into the truck?

   a) $\frac{3}{8}$ b) $1\frac{1}{8}$ c) $\frac{1}{2}$ d) $\frac{9}{16}$

4. Suppose on Monday, a bus driver uses $\frac{1}{5}$ of a tank of gasoline, and on Tuesday, he uses $\frac{5}{6}$ of a tank of gasoline, How much did he use in those two days?

   a) $1\frac{1}{30}$ b) $\frac{6}{11}$ c) $\frac{10}{30}$ d) $\frac{31}{60}$

5. A man drives some visiting friends to the Tampa airport with the luggage rack full and uses $\frac{3}{8}$ of a tank of gas. On the return trip, he uses $\frac{1}{5}$ of a tank. How does the return trip compare in fuel consumption to the trip to the airport?

   a) $\frac{1}{3}$ b) $\frac{9}{13}$ c) $\frac{7}{40}$ d) $\frac{9}{40}$

6. A woman has $\frac{1}{8}$ of a tank of gasoline in her car. The gas attendant adds $\frac{3}{4}$ of a tank. She uses $\frac{2}{3}$ of a tank running errands. How much gas is left in the tank?

a) $1\frac{13}{24}$ b) $\frac{1}{3}$ c) $\frac{9}{11}$ d) $\frac{5}{24}$

7. In the summer, John used $\frac{3}{4}$ of a tank of gasoline when driving to work at night without running the air conditioner. However, on the day shift when he used the air conditioner, he used $\frac{7}{8}$ of a tank of gasoline. Compare the two trips and describe the results.

a) $\frac{1}{3}$ less without a/c b) $\frac{3}{40}$ less without a/c c) $\frac{1}{2}$ more with a/c d) $\frac{3}{40}$ more with a/c

8. Jill uses $\frac{4}{5}$ of a tank of gasoline driving to work each week. Her husband Bob, whose vehicle has the same tank size, uses $\frac{2}{3}$ of a tank driving to his job each week. What is their total gasoline useage?

a) $\frac{2}{15}$ tank b) $\frac{11}{15}$ tank c) $1\frac{7}{15}$ tank d) 1 tank

9. Suppose a woman's car and truck have the same size tank. When a woman drives her car to work, she uses $\frac{3}{4}$ of a tank in a week. When she drives her truck to work, she uses $\frac{4}{5}$ of a tank. Which vehicle uses more gasoline and how much more?

a) car $\frac{1}{20}$ b) car $\frac{7}{9}$ c) truck $\frac{7}{9}$ d) truck $\frac{1}{20}$

10. A man had a Nova with a 6-cylinder engine, and he used $\frac{1}{2}$ of a tank of gasoline to drive to work each week. Then when he bought a new car, It was identical to the old car except it had a V-8 engine. Now, he uses $\frac{5}{6}$ of a tank of gasoline. Does the engine size make a difference and if so, how much?

a) Yes, $\frac{1}{3}$ tank b) No. c) Yes, $\frac{1}{6}$ tank d) Yes, $\frac{2}{3}$ tank

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FRACTION ANSWER KEY

PAGE 3

1) 2
2) 4
3) 9
4) 6
5) 14
6) 5
7) 12
8) 25
9) 25

1) 3/4
2) 1/3
3) 2 3
4) 2/3
5) 9/16
6) 11/24
7) 4/5
8) 2/3
9) 3/5

1) 3
2) 3 1/3
3) 3 2/3
4) 4
5) 2 1/8
6) 5
7) 2 1/5
8) 4 1/2
9) 6 2/3

PAGE 4

1) 7/8
2) 1 5/12
3) 1 1/6
4) 1 7/15
5) 1
6) 1 7/12
7) 1 1/24
8) 17/20
9) 1 1/20
10) 13/15
11) 1 11/24
12) 1 7/40

1) 1/20
2) 1/12
3) 1/2
4) 2/15
5) 9/20
6) 5/24
7) 7/20
8) 7/24
9) 1/12
10) 17/40
11) 1/8
12) 8/15

PAGE 5-6

1) b
2) c
3) a
4) a
5) c
6) d
7) b
8) c
9) d
10) a

Real-World Problems

Involving ——

Decimals Fractions or Percents

S T A N D A R D # U

Solve Real-World Problems Involving Fractions, Decimals, and Percents

SKILL 32

Solve real-world problems involving decimal fractions or percents and one or two distinct operations.

#U-32

HOW TO SOLVE PERCENT WORD PROBLEMS

WHAT IS A PERCENT? The word "percent" can be read "hundredths", and indicates the number of parts out of a hundred parts. The symbol for percent is "%" and may be used to replace the word "percent".

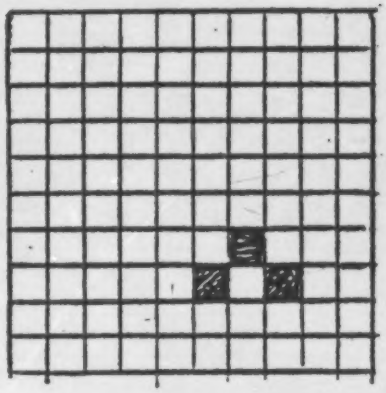

Figure 1 shows 100 small squares with 3 of the squares shaded. The 3 shaded squares represent 3 parts out of 100 parts and may be written as 3%.

If all the 100 squares were shaded, the 100 shaded parts would represent 100 parts out of 100 parts. This would be written as 100%. In this case, the shaded part is the "whole thing". Therefore, 100% always represents "all of something" or "the whole thing".

CHANGING A PERCENT TO A DECIMAL. A percent means a"hundredth". Therefore, 3% means 3 hundredths which is written as .03 . A percent problem can't be correctly computed unless the percent is changed to a decimal. When changing from a % to a decimal, move the decimal point 2 places to the left and remove the percent sign.

****** RULE: Move the point ..... 2 places to the
Left
And
Remove the
Percent
Sign .....Or abbreviated, 2LARPS.

(Note: If there is no percent sign to remove, then you would not use 2LARPS.)

Examples:

15.%	= .15	
7.%	= .07	(If there is no decimal point shown, then it appears to the right of the last digit.)
16.5%	= .165	
.3%	= .003	
25%	= .25	

Change each percent to a decimal.

(1) 32% = _____ (2) 210% = _____ (3) 16.3% = _____

(4) 7% = _____ (5) 42.3% = _____

Answers: (1) .32 (2) 2.10 (3) .163 (4) .07 (5) .423

r/w

CHANGING A DECIMAL TO A PERCENT. When changing a decimal to a percent, move the decimal two places to the right and add the percent sign.

RULE: Move the point ..... 2 places to the
Right and
Add the
Percent
Sign

Or abbreviated, 2RAPS.

(Note: If a percent sign is already present, you would not use the 2RAPS rule.)

Examples: .26 = 26.%
.0003 = .03%
.5 = 50.%
2 = 200%

Change each decimal to a percent.

(1) .13 = _____% (2) .7 = _____% (3) .436 = _____%

(4) .05 = _____% (5) 4 = _____%

DECIDING WHICH OPERATION TO USE IN SOLVING PERCENT PROBLEMS.

A percent problem is always similar to the following examples:

20% of 10 is 2 60 is 50% of 120
40% of 200 is 80 7 is 25% of 28

Any percent problem can be put in the form: _____% of _____ is _____.

Because "of" means "multiply", each percent problem is also a kind of multiplication problem.

In order to figure out a percent problem, two of the three numbers must be given in the problem. It is then your job to figure out the third number or the missing number by either multiplying or dividing.

Look at any multiplication problem: 2 X 4 = 8

Suppose the 8 is the missing number. 2 X 4 = _____, Multiply 2 X 4 to get the answer.

Answers: (1) 13% (2) 70% (3) 43.6% (4) 5% (5) 400%

r/w

#U-32

Suppose the 4 is the missing number, 2 X ___ = 8. Divide to get the answer. 8 divided by 2 = 4.

Suppose the 2 is the missing number. ___X 4 = 8. Divide to get the answer. 8 divided by 4 = 2.

&#&!! The following procedure will tell you just what operation to use:

(1) Draw a box beneath the blank.

(2) Place a times sign (X) beneath the word "of".

(3) Place an = sign under the word "is".

(4) Place a blank under each number.

___% of 50 is 200

☐ X ___ = ___

(5) Fill in the box and the blanks with 2 X 4 = 8.

___% of 50 is 200

2 X 4 = 8

(6) Ask yourself, "What would I do with a "4" and an "8" (the numbers in the blanks) to get a "2" (the number in the box)?" You would divide "8" by "4".

(7) Since you would divide the "8" by "4", the you must divide the "200" by "50".

200 ÷ 50 = 4

(8) Since the missing number is in the percent blank, you must change the number to a percent.
Do you use 2LARPS or 2RAPS? Are you adding a percent sign (APS) or removing a percent sign (RPS)? You are adding a percent sign, so use 2RAPS.

4 = 400%

Now, notice how this procedure is used on the example page that follows. Then, try it out on the page of problems that follows the example page. Really try to make it work. It will help you decide whether to multiply or divide on percent problems!!!!!!

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EXAMPLE PAGE

Example 1: 52% of 60 is ____

2 x 4 = [8]

$$\begin{array}{r} .52 \\ \times 60 \\ \hline 00 \\ 312 \\ \hline 31.20 \end{array}$$

The answer is 31.20

You multiply 2 X 4 to get the answer 8. Therefore, you multiply .52 X 60 to get the missing number.

Note: when you begin to compute a percent problem, you must move the point two places to the left and remove the percent sign... 2LARPS.....2LARPS.....

Example 2: 27% of ____ is 81

2 x [4] = 8

$$.27\overline{)81.00} \quad 300.$$

$$\begin{array}{r} 81 \\ \hline \times 00 \end{array}$$

The answer is 300.

You divide 8 by 2 to get the answer 4. Therefore, divide 81 by .27 to get the missing number.

Note: when you begin to compute a percent problem, you must move the point 2 places to the left and remove the percent sign... 2LARPS.....2LARPS.....

Example 3: ____% of 45 is 9

[2] x 4 = 8

$$45\overline{)9.00} \quad .20 = 20\%$$

$$\begin{array}{r} 90 \\ \hline \times 0 \end{array}$$

The answer is 20%

You divide 8 by 4 to get the answer 2. Therefore, divide 9 by 45 to get the missing number.

Note: since the missing number goes in the % blank, .20 must be changed into a percent by moving the point 2 places to the right and adding a percent sign.... 2RAPS.....2RAPS.....

PERCENT PROBLEMS

Directions: Use the procedure outlined on the previous pages to find the missing numbers in these percent problems.

(1) _____% of 30 is 24

(2) 37.5% of 64 is _____

(3) 25% of _____ is 40

(4) _____% of 15 is 30

(5) 40% of 75 is _____

(6) 12.5% of _____is 70

(7) _____% of 60 is 12

(8) 12 is 25% of _____

(9) _____ is 13% of 65

(10) 16 is _____% of 40

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DIRECTIONS: Use each fact given to answer the questions that follow.

FACT: DID YOU KNOW THAT you lose as much as 20% of the heat from the oven each time you open the door.

(Answer each of these percent questions, assuming each time you open the oven door, you lose 20% of the heat.)

1. If your mother was baking a cake at 375° and you opened the oven door, how many degrees would the oven temperature drop?

   a) 300° b) 75° c) 450° d) 90°

2. If you lose 20% of the heat each time you open the door, what percent of the heat will remain in the oven?

   a) 355% b) 55% c) 80% d) 380%

3. If you were baking a pie at 425° and you opened the oven door, how hot would the oven still be after the door was closed again?

   a) 340° b) 510° c) 85° d) 80°

FACT: DID YOU KNOW THAT a car air conditioner reduces fuel economy an average of 10%.

4. If a person gets 20 miles per gallon (mpg) when the car's air conditioner <u>is</u> <u>not</u> in use, how many miles per gallon will a person get when the air conditioner <u>is</u> in use?

   a) 30 mpg b) 22 mpg c) 10 mpg d) 18 mpg

5. If 10% represents the mileage you <u>lose</u> when the car's air conditioner is in use, what percent represents the mileage you get?

   a) 10% b) 100% c) 80% d) 90%

6. If a person gets 16.2 miles per gallon when the car's air conditioner <u>is</u> in use, how many miles per gallon will a person get when the air conditioner <u>is</u> <u>not</u> in use?
   (Hint: 16.2 equals what percent of the mpg travelled when the air conditioner is not in use.)

   a) 18mpg b) 17.82 mpg c) 2612 mpg d) 30.78 mpg

FACT: DID YOU KNOW THAT if you slip a quarter under the door and it goes through easily, you need weatherstripping. ALSO, if you move a lighted candle around the frames and sashes of your windows, and the flame dances around, you need caulking and/or weatherstripping. By caulking and/or weatherstripping doors and windows, the savings in annual energy costs could amount to 10%

7. Suppose a family spends $450 dollars annually in heating and air conditioning costs for electricity. Then the family weatherstrips and/or caulks around all their doors and windows. How much money could they save annually on heating and air conditioning? (Assume this family will only save 8% by caulking and/or weatherstripping).

   a) $45 b) $414 c) $36 d) $486

8. Suppose a family spends $625 dollars annually on heating and air conditioning costs for electricity. Then the family weatherstrips and/or caulks around all the windows and doors. What will they spend on heating and cooling the following year? (Assume this family will only save 11% by caulking and/or weatherstripping.)

   a) $69.05 b) $555.95 c) $614 d) $694.05

FACT: DID YOU KNOW THAT 16% of the electricity we use in our homes goes into lighting. To conserve electricity used for lighting, always turn off an incandescent light because an incandescent bulb uses no more electricity by being turned off and on. Also turn off a fluorescent light if you don't plan to return to the room for at least 15 minutes.

9. Suppose a family's monthly electric bill is $67.25. If 16% of the monthly bill is spent on lighting, how much did they spend on lighting?

   a) $4.20 b) $56.49 c) $10.76 d) $51.25

10. Suppose a family figures they spend $20 each month on lighting. If $20 represents 16% of their monthly bill, how much is their their monthly bill?

    a) $16.80 b) $125 c) $23.20 d) $52

11. Suppose a family figures they spend $16.48 on lighting each month. If this is 16% of their monthly bill, how much will their monthly bill be?

    a) $103 b) $2.64 c) $32.48 d) $80

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EXAMPLES

A WATT is the unit used for measuring the amount of electric energy used by an electric device, just as a yard is the unit used for measuring cloth or a mile is the unit used for measuring distances across country. Since a watt is a very small unit, the kilowatt is used in measuring when large amounts of electricity are used. A KILOWATT is 1000 watts.

1. a. How would you change watts to kilowatts?
   b. When you divide by 1000, you move the decimal point___places to the _____.

2. How many kilowatts are there in 24,365 watts? in 56,325 watts? in 16,245 watts? in 8,644 watts? in 43,540 watts?

3. How many kilowatts are there in 860 watts? in 40 watts? in 10 watts?

The 60W on a light bulb, or on any electric appliance, means more than just 60 units of measure. It means that the light bulb will use 60 watts of electricity in one hour or 2 x 60 watts, or 120 watts, in 2 hours. Electricity is purchased by the kilowatt-hour. A kilowatt-hour is the amount of electricity used or produced at the rate of a kilowatt (1000 watts) per hour. It is abbreviated as KWH.

4. Change to kilowatts: 60W; 75W; 100W; 120W; 150W.

5. If you burn a 100-watt bulb for 8 hours, how many kilowatt-hours of electricity will you use?

Answers:
1.a Divide by 1000
b 3,Left
2. 24.365; 56.325; 16.245; 8.644; 43.540
3. .86; .04; .01
4. .06; .075; .1; .12; .15
5. .8

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COST OF ELECTRIC APPLIANCES

1. Bobby found a metal plate on most electric appliances that gave the number of watts used per hour. His new radio used 45 watts per hour.

   a. How many watts will the radio use in 9 hours?
   b. Change the watt-hours used to kwh.
   c. At an average cost of 5.3¢ per kwh, find the cost of playing the radio for 9 hours.

2. How long will it take a 40 watt bulb to use 1 kwh of electricity?

3. The Whites have an indirect ceiling light that burns three 100 watt bulbs. If they averaged burning the light 3½ hours each night during January (31 days), how many kwh did it use during that month?

4. Using a 1000 watt iron, Jane ironed for 2 hours. At an average cost of 5.4¢ per kwh, what was the cost of the electricity?

5. What would be the cost of ironing for 6 hours?

6. The clock (2watts) runs 24 hours per day. During the month of April (30 days), how many kwh did it use?

   b. At 5¢ per kwh, what was the cost of running the clock?

7. Mary estimates that 30 minutes is required each time she uses her sandwich grill. Since it is marked 550w, how many kwh does it use each time?

   b. At 5½¢ per kwh, what does it cost each time?

8. A 90 watt fan ran continuously one day for 18 hours. At 5½¢ per kwh, what was the cost of running the fan that day?

9. What would it cost to run the same fan 18 hours at 4½¢ per kwh?

10. A vacuum cleaner is marked 250w. Mary used the cleaner 3 hours one morning. At 6¢ per kwh, what was the cost of the electricity used?

11. A certain refrigerator motor uses 250 watts per hour. The motor runs about 8 hours each day. In a 30-day month, how many kwh does it use?

    b. At an average cost of 5.4¢ per kwh, what is the cost of the electricity used?

12. A large home freezer uses 3 kwh per day. What will be the cost at 6¢ per kwh for a 30-day month?

13. Some appliances give the amperes and volts instead of watts. In this case, use this formula: Volts (V) times amperes (A) equals watts, or W=AV. Since the voltage in most places is 120, write the formula using 120 for volts.

14. If an electric iron is marked 5A, how many watts does it use on a 120 volt current?

15. How many watts are used in a 120 volt circuit if the amperes are:

    a. 1A b. 6A c. 4.6A d. 12A e. 15A?

NOTE: The fuse plugs in your fuse box are marked in amperes. The most common fuse is 15A. Amperes measure the size of the current, volts measure the pressure.

16. An electric fan is marked 1½A, 110V.

    a. How many kilowatt-hours will the fan use in 8 hours?

    b. At an average cost of 5½¢ per kwh, find the cost.

17. A larger fan is marked 2.5A, 110/120V. If the fan is used for 10 hours on 120V, find the kwh of electricity used.

18. At 5.7¢ per kwh, find the cost of running the fan in problem 17.

19. How many 120 watt lamps can you operate on the following fuses:

    a. 5A b. 10A c. 15A d. 20A e. 30A

20. How many amperes does a 960 watt toaster require on a 120 volt current? (Hint: use W = A V)

Consumption and Cost Per Month for Electricity

DIRECTIONS:
At $.055 per kwh, find the cost of the following to the nearest cent.

Heating, Air Conditioning	Kilowatt Hours	Cost
Home Heating	1,930	1a._____
Oil Burner	50	b._____
Furnace Fan	100	c._____
Room Air Conditioner	300	d._____
Dehumidifier	67	e._____
Humidifier	60	f._____
Lighting		
5 Room House (winter)	50	2a._____
6 Room House (winter)	60	b._____
8 Room House (winter)	80	c._____
Christmas Lights	120	d._____
Cooking, Refrigerating		
Freezer (14 cu.ft.)	140	3a._____
Oven (microwave)	25	b._____
Oven (self-cleaning)	96	c._____
Range	100	d._____
Refrigerator	83	e._____
Refrigerator/Freezer (frost-free)	167	f._____

(continued)

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	Kilowatt Hours	Cost
Laundry, Hot Water		
Dryer	80	4a. _____
Iron	13	b. _____
Washer	9	c. _____
Water Heater (quick recovery)	183	d. _____
TV, Radio, Hi-Fi		
Hi-Fi	9	5a. _____
Radio	8	b. _____
TV (black & white)	50	c. _____
TV (color)	100	d. _____
Kitchen		
Blender	1.25	6a. _____
Broiler	8	b. _____
Carving Knife	.66	c. _____
Coffeemaker	8	d. _____
Deep Fryer	7	e. _____
Dishwasher	30	f. _____
Frying Pan	15	g. _____
Hot Plate	7.5	h. _____
Mixer	1	i. _____
Toaster	3	j. _____
Trash Compactor	4	k. _____
Waffle Iron	2	l. _____
Waste Disposer	2.5	m. _____

(continued)

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r/w

	Kilowatt Hours	Cost
Health, Beauty		
Hair Dryer	1	7a._____
Heat Lamp	1	b._____
Shaver	.15	c._____
Sun Lamp	1.33	d._____
Toothbrush	.04	e._____
Other		
Battery Charger	1	8a._____
Blanket (electric)	22	b._____
Clocks (4)	6	c._____
Fan (circulating)	3.5	d._____
Fan (window)	14	e._____
Heating Pad	1	f._____
Power Tools (drill, sander)	3 .	g._____
Vacuum Cleaner	4	h._____
Well Pump (3/4 h.p.)	20	i._____

One kilowatt equals 1000 watts. A 100-watt electrical item consumes one kilowatt in ten hours.

Based on a 1300 square feet five-room house with a year-round budget payment.

Figures compiled from Northern States Power Company and Electric Energy Association.

Consumption and Cost Per Year for Electricity

Directions: At $.055 per kwh, find the cost of the following to the nearest cent.

Major Appliances	Estimated KWH Used Annually	Cost
Air-Conditioner (room) (Based on 1000 hours of operation per year. This figure will vary widely depending on geographic area and specific size of unit)	860	9a._____
Clothes Dryer	993	b._____
Dishwasher (including energy used to heat water)	2,100	c._____
Dishwasher only	363	d._____
Freezer (16 cu.ft.)	1,190	e._____
Freezer (frostless-16.5cu.ft.)	1,820	f._____
Range/Oven	700	g._____
Range w/Self-Cleaning Oven	730	h._____
Refrigerator (12 cu.ft.)	728	i._____
Refrigerator (frostless-12 cu.ft.)	1,217	j._____
Refrigerator/Freezer (12.5 cu.ft.)	1,500	k._____
Refrigerator/Freezer (frostless 17.5cu.ft.)	2,250	l._____
Washing Machine (automatic) (including energy for hot water)	2,500	m._____
Washing Machine only	103	n._____
Washing Machine (non-automatic) (including energy for hot water)	2,497	o._____
Washing Machine only (non-automatic)	76	p._____
Water Heater	4,811	q._____

(continued)

#U-32

Kitchen Appliances	Estimated KWH Used Annually	Cost
Blender	15	10a._____
Broiler	100	b._____
Carving Knife	8	c._____
Coffee Maker	140	d._____
Deep Fryer	83	e._____
Egg Cooker	14	f._____
Frying Pan	186	g._____
Hot Plate	90	h._____
Mixer	13	i._____
Microwave Oven	190	j._____
Roaster	205	k._____
Sandwich Grill	33	l._____
Toaster	39	m._____
Trash Compactor	50	n._____
Waffle Iron	22	o._____
Waste Disposer	30	p._____

(continued)

Heating and Cooling	Estimated KWH Used Annually	Cost
Air Cleaner	216	11a.
Electric Blanket	147	b.
Dehumidifier	377	c.
Fan (attic)	291	d.
Fan (circulating)	43	e.
Fan (rollaway)	138	f.
Fan (window)	170	g.
Heater (portable)	176	h.
Heating Pad	10	i.
Humidifier	163	j.
Laundry		
Iron (hand)	144	12a.
Health & Beauty		
Germicidal Lamp	141	13a.
Hair Dryer	14	b.
Heat Lamp (infra-red)	13	c.
Shaver	1.8	d.
Sun Lamp	16	e.
Toothbrush	.5	f.
Vibrator	2	g.

(continued)

Home Entertainment	Estimated KWH Used Annually	Cost
Radio	86	14a. _____
TV - Tube type (black & white)	350	b. _____
TV - Solid state (black & white)	120	c. _____
TV - Tube type (color)	660	d. _____
TV - Solid state (color)	440	e. _____

Housewares		
Clock	17	15a. _____
Floor Polisher	15	b. _____
Sewing Machine	11	c. _____
Vacuum Cleaner	46	d. _____

NOTE: When using these figures for projections, such factors as the size of the specific appliance, the geographic area of use, and individual use should be taken into consideration.

#U-32

ANSWER KEY

Real-World Problems
Decimal, Fractions or Percent

PAGE 5

1) 80%
2) 24
3) 160
4) 200%
5) 30
6) 560
7) 20%
8) 48
9) 8.45
10) 40%

PAGES 6 & 7

1) b
2) c
3) a
4) d
5) d
6) a
7) c
8) b
9) c
10) b
11) a

PAGE 9

1) a. 405W
   b. .405kwh
   c. $.02 or 2¢
2) 25 hours
3) 32.55kwh
4) $.11 or 11¢
5) $.32 or 32¢
6) a. 1.44kwh
   b. $.07 or 7¢
7) a. .275kwh
   b. $.02 or 2¢
8) $.09 or 9¢
9) $.07 or 7¢
10) $.05 or 5¢

PAGE 10

11) a. 60kwh
    b. $3.24
12) $5.40
13) W = A x 120
14) 600W
15) a. 120w
    b. 720w
    c. 552w
    d. 1440w
    e. 1800w
16) a. .165kwh/110v or .18kwh/120v
    b. $.01 or 1¢
17) 3kwh
18) $.17 or 17¢
19) a. 5
    b. 10
    c. 15
    d. 20
    e. 30
20) 8A

(continued)

ANSWER KEY CONTINUED

PAGE 11

1) a. $106.15
b. $2.75
c. $5.50
d. $16.50
e. $3.69
f. $3.30

2) a. $2.75
b. $3.30
c. $4.40
d. $6.60

3) a. $7.70
b. $1.38
c. $5.28
d. $5.50
e. $4.57
f. $9.19

PAGE 12

4) a. $4.40
b. $ .72
c. $ .50
d. $10.07

5) a. $ .50
b. $ .44
c. $2.75
d. $5.50

6) a. $ .07
b. $ .44
c. $ .04
d. $ .44
e. $ .39
f. $1.65
g. $ .83
h. $ .41
i. $ .06
j. $ .17
k. $ .22
l. $ .11
m. $ .14

PAGE 13

7) a. $ .06
b. $ .06
c. $ .01
d. $ .07
e. $ .00

8) a. $ .06
b. $1.21
c. $ .33
d. $ .19
e. $ .77
f. $ .06
g. $ .17
h. $ .22
i. $1.10

PAGE 14

9) a. $ 47.30
b. $ 54.62
c. $115.50
d. $ 19.97
e. $ 65.45
f. $100.10

9 cont.) g. $ 38.50
h. $ 40.15
i. $ 40.04
j. $ 66.94
k. $ 82.50
l. $123.75

9 cont.) m. $137.50
n. $ 5.67
o. $137.34
p. $ 4.18
q. $264.61

(continued)

ANSWER KEY CONTINUED

PAGE 15

10) a. $ .83
b. $ 5.50
c. $ .44
d. $ 7.70
e. $ 4.57
f. $ .77
g. $10.23
h. $ 4.95
i. $ .72
j. $10.45
k. $11.28
l. $ 1.82
m. $ 2.15
n. $ 2.75
o. $ 1.21
p. $ 1.65

PAGE 16

11) a. $11.88
b. $ 8.09
c. $20.74
d. $16.01
e. $ 2.37
f. $ 7.59
g. $ 9.35
h. $ 9.68
i. $ .55
j. $ 8.97

12) $7.92

13) a. $7.76
b. $ .77
c. $ .72
d. $ .10
e. $ .88
f. $ .03
g. $ .11

PAGE 17

14) a. $ 4.73
b. $19.25
c. $ 6.60
d. $36.30
e. $24.20

15) a. $ .94
b. $ .83
c. $ .61
d. $ 2.53

THE END

Problems

S T A N D A R D # V

Solve Money Problems

Skill 33: Solve real-world problems involving comparison shopping.

Skill 34: Solve real-world problems by finding the amount of simple interest.

Skill 35: Solve real-world problems involving purchases and a rate of sales tax.

Skill 36: Solve real-world problems involving purchases and rate of discount given in fraction or percent form.

#V-33, 34, 35 & 36

BUYING GASOLINE

A gas war has been declared by the gas stations in the area. Prices noted at the pumps and various services offered are as follows:

	A Bill's Gulf	B Tom's Shell	C C.J.'s Texaco
Regular Gas	.64¢	.63¢	.62¢
Unleaded Gas	.67¢	.67¢	.68¢
Premium Gas	.70¢	.72¢	.70¢
Car Wash	$1.50	$ 1.60	$1.70
Lubrication	$2.00	$ 1.75	$1.60
Oil Change	$6.50	$46.00	$8.00

EXAMPLE: 15 gallons of regular gas and 13 gallons of premium would cost what at the various stations.

Bill's Gulf	Tom's Shell	C.J.'s Texaco
15 x $.64 = $ 9.60	15 x $.63 = $ 9.45	15 x $.62 = $ 9.30
13 x $.70 = $ 9.10	13 x $.72 = $ 9.36	13 x $.70 = $ 9.10
$18.70	$18.81	$18.40

C.J.'s Texaco is the best buy. Circle the letter C.

a) Bill's b) Tom's c) C.J.'s

&&&&&&&&

Determine which station offers the better buy on the following:

1. 20 gallons of unleaded and 22 gallons of regular.

   A B C

2. 11 gallons of premium and 25 gallons of unleaded.

   A B C

3. 10 gallons of regular, 15 gallons of unleaded, and 12 gallons of premium.

   A B C

#V-33, 34, 35 & 36

4. 25 gallons of regular, 10 gallons of unleaded, and 15 gallons of premium.

   A B C

5. A lubrication and an oil change.

   A B C

6. A lubrication and a car wash.

   A B C

7. An oil change and a car wash.

   A B C

8. A car wash, lubrication and an oil change.

   A B C

9. 15 gallons of regular and a lubrication.

   A B C

&&&&&&&&

In common language, "interest" is paying for the use of money. An example of this idea can be found at any bank. Banks make a profit from the money they loan to customers by charging interest (rent) for loans. Customers make a profit when the banks pay them a certain interest (rent) for the use of their money. Savings accounts and time certificates are ways for customers to take advantage of interest being paid to them by banks.

For example: Mrs. White has recorded in her savings account, savings of $5000. The bank will pay her 6% interest per year. How much interest will she accumulate in one year?

Simple multiplication is required to find the solution. The following formula will help.

$$I = R \times P \times T$$

I = interest (in money)

R = rate (in percent) *Remember to change % to decimal 6% = .06

P = principle (in money)

T = time (year)

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money

$$I = R \times P \times T$$

$$__ = .06 \times 5000 \times 1$$

$$__ = 300 \times 1$$

$$I = \$300$$

Dishwashers obviously save a lot of labor. Oddly enough, they also save on energy. The dishwasher actually uses less hot water (provided it is fully loaded) than you would use washing the dishes in your kitchen sink. An average dishwasher uses 14 gallons of hot water per load.

Despite its cost the dishwasher remains a popular item because of the time and labor saving features.

Listed below are the "list" prices for various makes of dishwashers.

Frigidaire:	
Front loading portable	$289.95
Undercounter model	$279.95
General Electric:	
Convertible portable	$249.95
Built-in model	$279.95
Potscrubbers model	$339.95
Panels	$ 14.95
Maytag:	
Portable convertible model	$344.81
Built-in model	$316.99
Westinghouse:	
Convertible model	$207.05
Undercounter model	$202.02
Panels	$ 13.31

Example: What would be the INTEREST under the following conditions:

Frigidaire - front loading portable at 7% for 1 year

$$I = R \times P \times T$$
$$I = .07 \times 289.95 \times 1$$
$$I = \$20.2965$$
$$I = \$20.30 \text{ rounded to nearest cent}$$

#V-33, 34, 35 & 36

Now you are on your own!!

Determine the amount of interest under the following circumstances. Round to nearest cent.

1. All models of Frigidaire at 6% for 1 year.

2. All models of General Electric at 8% for 1 year.

3. All models of Maytag at 10% for 1 year.

4. All models of Westinghouse at 11% for 1 year.

5. All models of General Electric at 6% for 2 years.

6. All models of Frigidaire at 11% for 2 years.

7. All models of Maytag at 8% for 2 years.

8. All models of Westinghouse at 6% for 2 years.

&&&&&&&&

Phosphates in Laundry Detergents

The phosphate content in laundry products are a nutrient essential to plant life. In excess, phosphates overenrich the waters with which they blend, and the growth of waterweeds and algae is accelerated. The fish die due to a lack of oxygen. This leads to clogged drainage systems as plants die. It is recommended that consumers buy low phosphate detergents, that they stay below 25 grams of phosphates per washload, and that they use measuring cups so that detergents will not be applied in quantities above those specified on the box.

Detergent	Amt per washload	Grams of Phosphates each load	Size of Box	Cost
Tide	1½ cup	5.8 grams	20 ozs	$ .69
Gain	1½ cup	5.8 grams	49 ozs	$1.61
All	1 cup	11 grams	84 ozs	$1.49
Cold P. XE	1½ cup	9.6 grams	84 ozs	$2.69
Oxydol	1½ cup	5.8 grams	84 ozs	$2.69
Rinso	1½ cup	5.8 grams	49 ozs	$1.19
Cheer	1½ cup	8.38 grams	20 ozs	$ .95
Ajax	1 cup	6.4 grams	49 ozs	$1.53

DIRECTIONS: Laundry detergent is one of those items in a grocery store that is not meant for human consumption and therefore, is taxed by the sales tax laws in your state. Sales tax is an extra charge added onto each dollar of nonconsumable products you buy. It is collected by the cashier and given to the state or local government.

Example: If the sales tax is 4% of each dollar, change 4% to a decimal, .04, and multiply .04 by the cost of the item.

$5.39 cost of detergent
x.04 rate of sales tax
$.2156 = $. 22 sales tax

Round off the answer to the nearest cent. To find the final cost, add the sales tax onto the cost of the item.

$5.39 cost of detergent
+ .22 sales tax
$5.61 final cost

Refer to the table of laundry detergents above to find the cost of various detergents inorder to answer the following questions.

1. If a woman buys a 5 pound 4 ounce box of ALL at 4% sales tax, how much sales tax will she be charged?

   a) $ .05 b) $1.55 c) $ .06 d) $1.54

2. If a man buys a 5 pound 4 ounce box of OXYDOL at 4% sales tax, what would be the final cost?

   a) $ .11 b) $.10 c) $2.80 d) $2.79

3. If Susan purchases a 1 pound 4 ounce box of TIDE at 5% sales tax, what would be the final cost?

   a) $ .72 b) $.03 c) $ .66 d) $2.76

4. Suppose you buy five, 3 pound 1 ounce boxes of GAIN at 5% sales tax, how much sales tax would you pay?

   a) $ .41 b) $8.45 c) $ .08 d) $.40

5. Suppose Joe buys a 5 pound 4 ounce box of COLD POWER XE and a 3pound 1 ounce box of RINSO at 3% sales tax, what will be the final cost?

   a) $ .12 b) $4.00 c) $ .11 d) $2.77

BONUS: Which detergent contains the most phosphates per washload?

SUBCOMPACT CARS	CURB WEIGHT	BASE PRICE *
AMC Gremlin	2630 pounds	$3649
Chevrolet Chevette 4	2105 pounds	$3459
Dodge Colt 4	2205 pounds	$3734

COMPACT CARS	CURB WEIGHT	BASE PRICE
AMC Pacer	3294 pounds	$3998
Chevrolet Malibu	3210 pounds	$4684
Oldsmobile Cutlass	3275 pounds	$4695

LARGE CARS	CURB WEIGHT	BASE PRICE
AMC Matador	3795 pounds	$4799
Chevrolet Impala	3765 pounds	$5829
Oldsmobile Delta 88	3655 pounds	$5706

LUXURY CARS	CURB WEIGHT	BASE PRICE
Cadillac Deville	4370 pounds	$10,444
Mercedes-Benz 240D	3210 pounds	$12,762
Cadillac Eldorado V8	5050 pounds	$11,921

* The base price is without options. Options are extra that can be added to the basic car such as power steering, air conditioning etc.

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money

AUTOMOBILE SELECTION AND ENERGY: The most significant variable affecting fuel consumption in an automobile is its weight. A car weighing 5000 pounds uses more than twice as much fuel as one weighing 2000 pounds. From the table on the previous page, the larger, heavier cars generally cost more, except for the Mercedes-Benz. The more expensive cars result in more sales tax when purchased, besides using more fuel.

DIRECTIONS: Use the table on the previous page to find the cost of various cars and answer the following questions on sales tax.

6. If the sales tax is 4% on each dollar spent, find the tax on the AMC Matador.

   a) $4990.96 b) $191.96 c) $19.20 d) $4818.20

7. If the sales tax is 4%, find the final cost of a Cadillac Eldorado.

   a) $47.68 b) $47.68 c) $476.84 d) $12,397.84

8. If the sales tax is 5%, find the final cost of an Oldsmobile Delta 88.

   a) $285.30 b) $5991.30 c) $28.53 d) $2734.53

9. If the sales tax is 3%, find the tax on a Chevrolet Impala that has a $600 air conditioner added onto the price as an option. (Note: This addition increases the car's cost, weight, sales tax, and fuel comsumption especially when the air conditioner is in use.)

   a) $18.00 b) $6621.87 c) $6429 d) $192.87

10. If a man decides to buy a Chevrolet Malibu plus have power steering as an option for $145 and power windows for $150, what would be the final cost of the car at 4% sales tax?

    a) $199.16 b) $5178.16 c) $187.36 d) $4979

BONUS: After deciding to buy a car, the cost of an inspection sticker, auto tag, and preparation charges are added to the cost of the car before the car can leave the lot. If the auto tag for a Chevrolet Malibu is $22.00, an inspection sticker is $3.00, and preparation charges are $125, find the <u>actual</u> final cost for the car in question #10.

DISCOUNTS

A discount is a certain percent or fraction of the original price that is subtracted to create a sale price.

____% of the Original Price is the Discount

The reduction of the original price of an article is done to sell the article more quickly, or to collect cash payment, or to draw more customers to the place of business.

Original Price
\- Discount
Sale Price

Example: Suppose Save-A-Penny Shoes is allowing a ¼ discount on a $20.00 pair of shoes. Find the amount of the discount.

¼ of the Original Price is the Discount

¼ of $20.00 is _____

"Of" means multiply.
"Is" means equal.

$$\frac{1}{4} \times \frac{\$20.00}{1} = \frac{\$20.00}{4} = \$5.00$$

$5.00 is the Discount.

Example: "Discount" means an amount of money deducted from the original price to get a sale price. Find the sale price in the above example.

Original Price	$20.00
\- Discount	- 5.00
Sale Price	$15.00

$15.00 is the Sale Price.

Example: Suppose "The Ranch" is having a 40% discount on all $25.00 jeans. Find the amount of discount.

____%	of	the Original Price	is	the Discount
40%	of	$25.00	is	_____

"Of" means multiply.
"Is" means equal.

40%	X	$25.00	=	_____

$25.00
X .40
0000
10000
10.0000

$10.00 is the Discount.

Example: Find the sale price in the above example.

Original Price	$25.00
- Discount	- 10.00
Sale Price	$15.00

$15.00 is the sale price.

Note: The Original Price = 100% of the price.
If the Discount Price = 40% of the price,
then the Sale Price = 60% of the price!!!!!

Example: If the discount is represented by 15%, what percent of the original price is the sale price?

Example: If the discount is represented by 10%, what percent of the original price is the sale price?

Answers: Sale price 85%
Sale price 90%

DISCOUNT! ON ALL CLOTHES DRYERS

CLOTHES DRYERS AND CONSERVING ENERGY

According to Consumer Reports, the differences in energy consumption were fairly insignificant among all the clothes dryers tested. However, the people who use the clothes dryers can make mistakes that do affect energy consumption. Here are some pointers:

* The larger the load, the more efficient the energy use. Wait until you have enough laundry to fill the dryer close to capacity. (Don't overstuff the dryer, that's wasteful, too.)

* The longer a dryer runs after the laundry is dry, the more energy it wastes. An automatic dryness control can save energy if it is set for minimum dryness. Also, a timer works well if a person is good at estimating the drying times of certain fabrics.

* Separate drying loads into heavy and lightweight items. Since the lighter ones take less drying time, the dryer doesn't have to be on as long for these loads.

* A clothes dryer's filter should be cleaned before each load.

* If you can use either a gas or an electric dryer, a gas dryer should cost you less to run. A gas dryer will cost as much to run as an electric dryer when the cost per therm is about 25 times the cost per kilowatt-hour of electricity. When the cost per therm is less than 25 times the cost per kwh, gas is cheaper; more than 25 times, electricity is cheaper.

* There are devices being invented that divert a dryer's exhaust indoors so that the hot air from the dryer can be used to heat the house. It is not all that easy, though. The moisture and the lint that are also exhausted are a problem. Also, the diverter can cost from $9 to $40. However, it is possible to direct $20 or so of energy a year back into your house.

* * * * * * * * * *

Directions: Use the examples on finding discounts from the previous pages and the facts on conserving energy while using a clothes dryer to answer the following questions.

1. Consumers Digest states that one of the best buys available is a General Electric gas dryer 7188P which originally lists for $320. It also states that at some stores, a discount of 22% can be found on this model. How much money would this discount save?

a) $7.40 b) $249.60 c) $70.40 d) $22.00

2. In question 1, if the dryer originally sells for $320 and is discounted by 22%, what is the sale price?

a) $70.40 b) $249.60 c) $298 d) $390.40

3. If the original price is 100% of the price and the discount is 22% of the price, what percent represents the sale price that is left after the discount has been subtracted?

a) 122% b) 88% c) 22% d) 78%

4. A Frigidaire electric dryer DE originally lists for $235 and may be discounted as much as 24%. What is the lowest sale price that could be found for this model?

a) $211 b) $178.60 c) $56.40 d) $229.36

5. If a General Electric dryer is on sale for $159.70 and the discount amounted to $50.25, what was the original price of the dryer?

a) $209.95 b) $109.45 c) $239.20 d) $80.20

6. If the original list price of a Hoover compact electric dryer is $149.95 and the store advertises a 20% discount, how much money will the discount save?

a) $119.96 b) $129.95 c) $29.99 d) $52.00

7. In question 6, if the dryer originally sells for $149.95 and is discounted by 20%, what is the sale price?

a) $29.99 b) $20.00 c) $119.96 d) $129.95

8. A Frigidaire laundry center is originally listed at $529 and is discounted by $\frac{1}{4}$ the original price. How much money will the discount save?

a) $132.25 b) $13.23 c) $25.00 d) $396.75

9. In question 8, if the original price is $529 and the discount is $\frac{1}{4}$, what is the sale price?

a) $504 b) $132.25 c) $515.77 d) $396.75

10. If the original price equals 100% of the price and the discount equals 25% of the price, what percent represents the sale price?

a) 125% b) 85% c) 75% d) 4%

BONUS: If the sale price of a dryer is $204 and the original price is $240, what is the percent of discount?

a) 36% b) 15% c) 25% d) 30%

A N S W E R K E Y

Comparison Shopping

P A G E 1

1) c
2) c
3) a

P A G E 2

4) c
5) b
6) a
7) a
8) a
9) c

P A G E 4

Frigidaire:
1a) $17.40
b) $16.80

General Electric:
2a) $20.00
b) $22.40
c) $27.20
d) $ 1.20

Maytag:
3a) $34.48
b) $31.70

Westinghouse:
4a) $22.73
b) $22.22
c) $ 1.46

General Electric:
5a) $29.99
b) $33.59
c) $40.79
d) $ 1.79

Frigidaire:
6a) $63.79
b) $61.59

Maytag:
7a) $55.17
b) $50.72

Westinghouse:
8a) $24.85
b) $24.24
c) $ 1.60

P A G E 6

1) d
2) c
3) a
4) d
5) b
Bonus: All

P A G E 7

6) b
7) c
8) b
9) d
10) b
Bonus: $5328.16

P A G E 1 0 & 1 1

1) c
2) b
3) d
4) b
5) a
6) c
7) c
8) a
9) d
10) c
Bonus: b

Measurement

S T A N D A R D # W

Solve measurement problems using metric and customary units.

Skill 37: Solve problems related to length, width, or height, using metric or customary units up to kilometers or miles, conversion with the system.

Skill 38: Solve problems involving the perimeter or area of a rectangular region using metric or customary units.

Skill 39: Solve problems involving capacity using units given in a table (milliliters, liters, teaspoons, tablespoons, cups, pints, quarts, gallons), conversion within the system.

Skill 40: Solve problems involving weight/mass using units given in a table (milligrams, grams, kilograms, metric tons, ounces, pounds, tons), conversion within the system.

#W-37, 38, 39, & 40

To the Student:

Because of the lack of perfect precision in instruments used for measuring time, weight, angles, temperature, length, area, volume and the like, there never has been recorded an exact measurement. Therefore, all numbers obtained from measuring are approximate numbers.

Probably you will understand approximate numbers if you think of them as being numbers which are not exact. Any number obtained by counting is considered to be exact. For example, six nickels, eight children, twelve eggs are exact quantities.

Any numbers obtained by measuring are approximate. For example, two hours, six feet, three pounds, ten gallons are approximate.

Many times, measurements are considered to be exact. If the sides of a square were assumed to be exactly 2 inches the perimeter (distance around) would be exactly 8 inches and the area would be exactly 4 square inches. The assumption that the length of a side of a square is exactly 2 inches has two serious practical defects. No one could construct a square with each side exactly equal to 2 inches, or measure its sides exactly if such a square did exist.

When we work with measurements, we should remember that they contain a possible error which is never greater than one-half of the unit used for measurement.

The smaller the unit of measurement used, the more precise the measurement will be.

The fundamental rule in working with measurements is "use the same unit of measurement for all measurements in a set."

Turn the page and see how well you can solve measurement problems using metric and customary units.

#W-37, 38, 39 & 40

Directions: Study the table below, then answer the questions.

LINEAR MEASURE		
10 milimeters (mm)	=	1 centimeter (cm)
100 centimeter (cm)	=	1 meter (m)
1000 meters (m)	=	1 kilometer (km)

In order to get electricity to your home the power company must construct large generators. Then they must build transmission lines to all the homes. Constructing these lines requires material such as; copper wire, power poles, and insulators.

1. Certain insulators used on power poles are 90mm high. If six insulators are used on one pole, they would have a combined length of how many centimeters?

2. One roll of electrical wire contains 6km of wire. If the crew uses 2km300m of wire, how many meters of wire are left?

3. To connect a new house to the power line required 1350 meters of copper wire. This equals how many kilometers?

4. The poles which support the power line are 8 meters long. If they are set into holes which are 150 centimeters deep, how high above the ground are the tops of the poles?

5. A porcelain insulator used on the power line is 39 centimeters long. How many milimeters is this equal to?

xxxxxxxxxxxxxxxx

#W-37, 38, 39 & 40

Probably you understand from previous study that areas are measured in square units. Look below at:

Figure 1

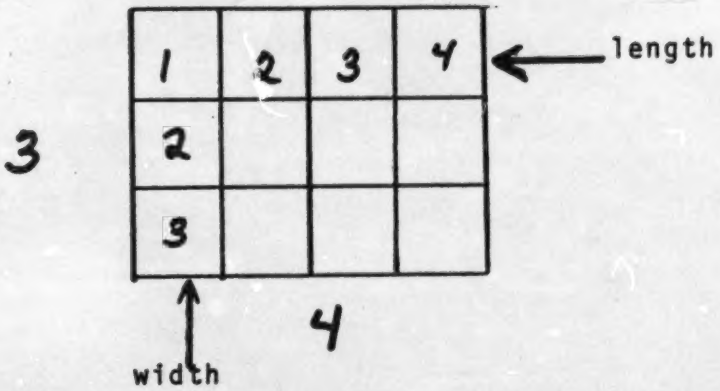


Figure 1 shows how the area of a rectangle is equal to the number of square units it contains. Each small square is one unit of length on a side. By counting the number of squares in Figure 1, you can see that the area is 12 square units.

A quick way to find the number of square units in the rectangle is to multiply the number which represents the count of the units in length by the number which represents the count of the units in width. Thus, 4 units times 3 units gives 12 units, which is the area of the rectangle in Figure 1.

The method of finding the number of square units in a rectangle (area) can be expressed in the formula A = lw (lxw).

l=length of rectangle
w=width of rectangle

Study Figure 1 again if you need to before working the problems below.

The greatest amount of energy used in a home is energy used to keep the house at a comfortable temperature. Therefore, proper insulation of the house is the most important energy-saving factor. Insulation in the ceiling does the most good per square foot of area. Up to 25% of heat loss and 40% of heat gain occurs through the ceiling.

The attic of a home can trap air which, when heated by the sun, can get to 130°F. Insulation can reduce the amount of heat coming through the ceiling into the home.

(continued)

#W-37, 38, 39 & 40

1. A roll of insulation covers 100 sq.ft. If you have an attic that measures 32 ft. by 45 ft., how many rolls are needed to insulate the attic?

2. A home owner wants to cover the ceiling of a room with insulating tile. Each tile is 12 in. by 12 in. If the ceiling is 10 ft. by 12 ft., how many tiles should he buy?

3. Air leakage is another important factor in heating or cooling a house. Your front door is probably 80 inches high and 36 inches wide. If there was only a 1/8 inch crack around the door, determine the actual number of square inches opening to the outside.

4. Insulation in the exterior walls of a house will reduce fuel consumption by an average of 8 percent. How many square feet of insulation will be needed for a wall 25 feet, 6 inches long and 8 feet high?

L I Q U I D M E A S U R E
1000 milliliters (ml) = 1 liter (l)
3 teaspoons (t.) = 1 tablespoon (T.)
2 cups = 1 pint (pt.)
2 pints = 1 quart (qt.)
4 quarts = 1 gallon (gal.)

Study the table above before continuing.

With automobiles, the greatest consumption of fuel occurs at high speed or very rapid acceleration. Most automobiles traveling at 55 mph (89km/h) get about 21% better mileage than when traveling at 70 mph (113km/hr).

1. A family traveled from Fort Lauderdale to Disney World (350km) and the car averaged 7 km per liter of gas at a speed of 113km per hour.

   a) Compute the number of liters of gas they used to make the trip.

   b) On the return trip, at a speed of 89km per hour the car averaged 8.5km per liter. How many liters of fuel would be used at that speed? Round to nearest 10.

2. The average automobile in the United States is driven 12,000 miles per year and averages 15 miles per gallon. If the car has a poorly adjusted carburetor it will lose 3 miles per gallon. This would be a loss of how many gallons in a year?

#W-37, 38, 39 & 40

Approximately 40 million automobiles are used to travel to and from work each day in the United States. It has been estimated that an average savings of 3.2 gallons per week for each car has been obtained by reducing the speed limit from 60 mph to 55 mph.

3. Compute the number of gallons of gasoline estimated to be saved weekly by lowering the speed limit to 55 mph.

4. A boat using a 35 horse power outboard motor running 32 mph can travel 1.9 miles per liter of gasoline. How many liters of gasoline would it use to go 57 miles?

5. During a period of six weeks, 34 qts. of oil were collected in the drip pans under the oil barrels in a shop supply room. How many gallons of oil were saved?

6. A car with a poorly adjusted carburetor wastes .04 liters of gasoline per kilometer driven. Assuming that the average automobile in the United States is driven 19,308 kilometers per year, determine how much fuel is wasted each year by a car with a poorly adjusted carburetor.

METRIC MASS	
1 kilogram =	1000 grams
1 gram =	$\frac{1}{1000}$ kilogram

Study the table above then continue.

The food supplies of the world are not evenly distributed. According to the United Nations, two-thirds of the human population is undernourished. Only protein - an item of limited source and severe maldistribution - can fight malnourishment successfully.

1. The people of New Zealand are the worlds greatest consumers of protein with an average of .038 kilograms of meat and poultry, .027 kilograms of milk and milk products, 5 grams of eggs, 2 grams of fish, and 22 grams of plant protein per person per day. What is the total protein intake each day per person?

2. The people of India average one gram of meat and poultry, four grams of milk and milk products, and forty grams of plant protein. How much more protein is consumed per person each day in New Zealand than in India?

#W-37, 38, 39 & 40

3. Estimated current annual production capacity of the coal industry is about 700 million tons. By 1985, this capacity is expected to increase by an additional 535 million tons. Determine the amount of coal estimated to be produced during 1985.

4. The coal reserves of the Eastern United States are about 202.3 billion tons. The Western reserves are 234.3 billion tons.

   a) What are the total United States reserves?

   b) How much more does the west have than the east?

ANSWER KEY

MEASUREMENTS

PAGE 2

1) 54cm
2) 3,700m
3) 1.35km
4) 6.5 meters
5) 390mm

PAGE 4

1) 15 rolls
2) 120 tiles
3) 29 square inches
4) 204 square feet

PAGE 4 - Liquid Measure

1) a. 50 liters
   b. 41.2 liters

2) 200 gal.

PAGE 5

3) 128,000,000 gal.
4) 30 liters
5) 8½ gallons
6) 772.32 liters

PAGE 5 - Metric Mass

1) 94 grams or .094 kilograms
2) 49 grams or .049kg

PAGE 6

3) 1235 million tons

4) a. 436.6 billion tons
   b. 32 billion tons

GRAPHS

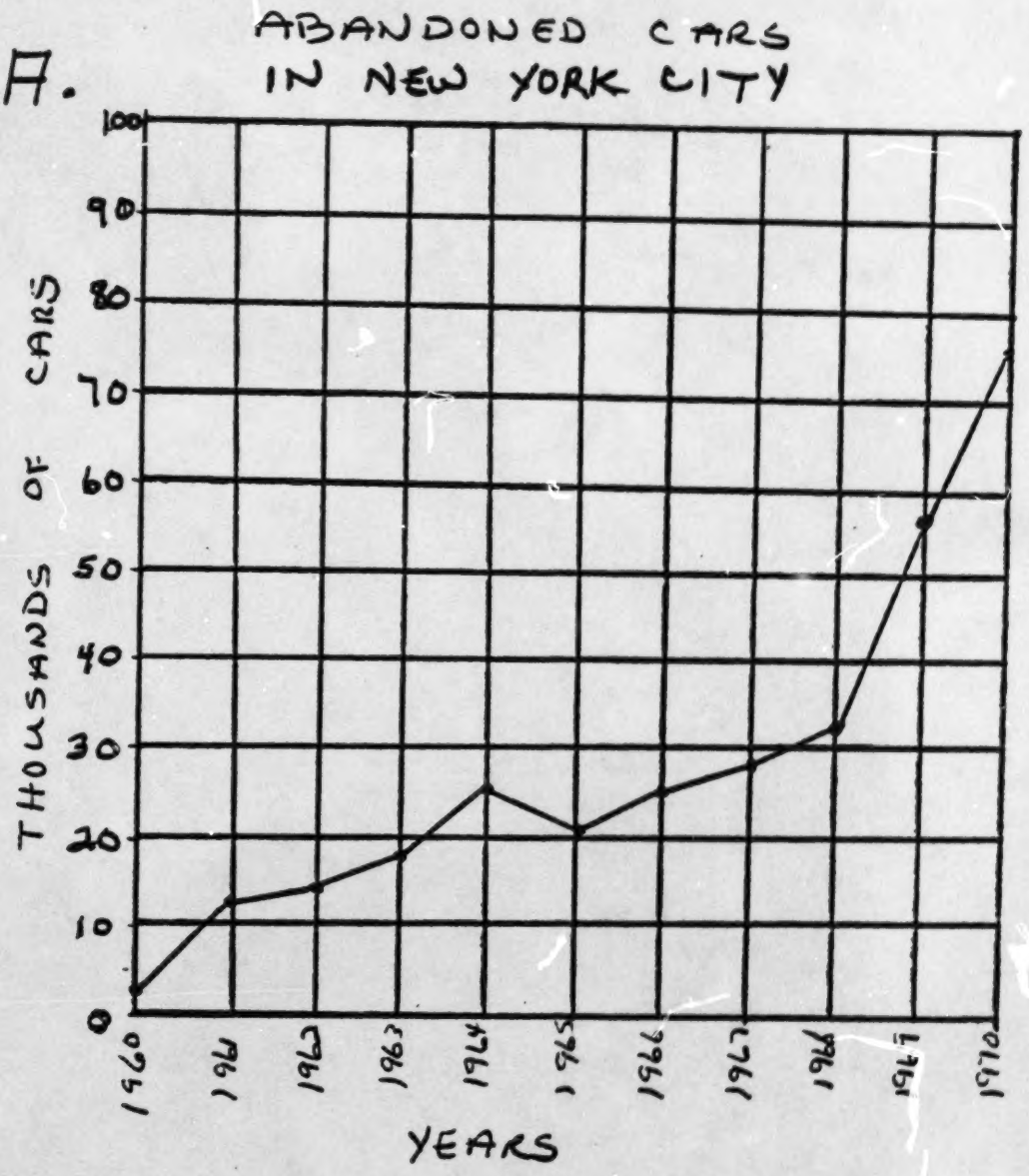
S T A N D A R D # X

Skill 41: Read and determine relationships described by line graphs, circle graphs, or tables.

#X-41

I - Line Graphs

A.



To the Student:

In order to read and interpret Line Graphs we must realize that we are only approximating the amount shown on the graph. For example, to find out how many automobiles were abandoned in New York City in 1970 - look along the bottom of the graph for the year 1970. Follow the line up to the point on the graph and read the amount shown on the number scale at the left side of the graph. In this case approximately 76,000 automobiles were abandoned.

(continued)

To find the year in which the least amount of cars was abandoned, look for the lowest point of the graph. Follow the line down to read the year. In 1960 the least amount of cars was abandoned, approximately 3000.

Answer the following questions:

1. Find the year in which the most cars were abandoned and give the amount.

2. Between which two years did the amount of abandoned cars drop?

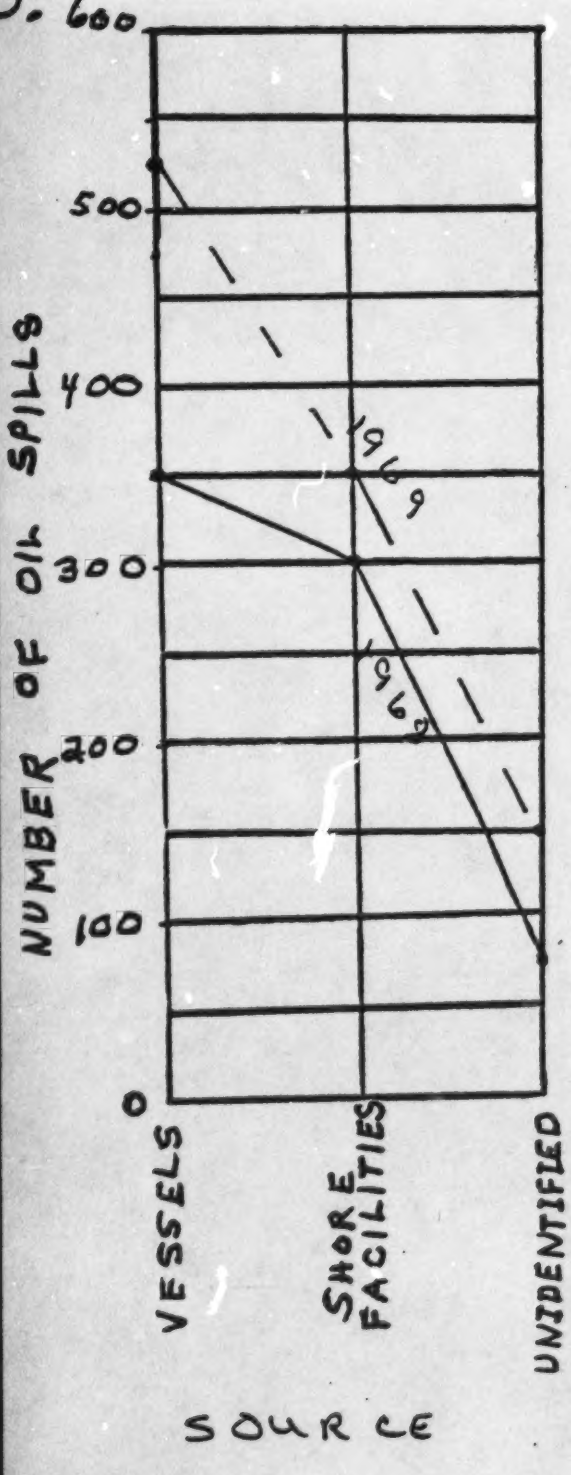
3. In which two years was the amount of abandoned cars most nearly the same?

4. What was the increase of abandoned cars between 1968 and 1969?

5. List each year and the amount of automobiles abandoned in New York City each year.

#X-41

B.



The number of oil spills in United States Waters over 100 barrels of oil.

_____ 1968

_ _ _ 1969

1. Between 1968 and 1969 what was the increase of oil spills from vessels?

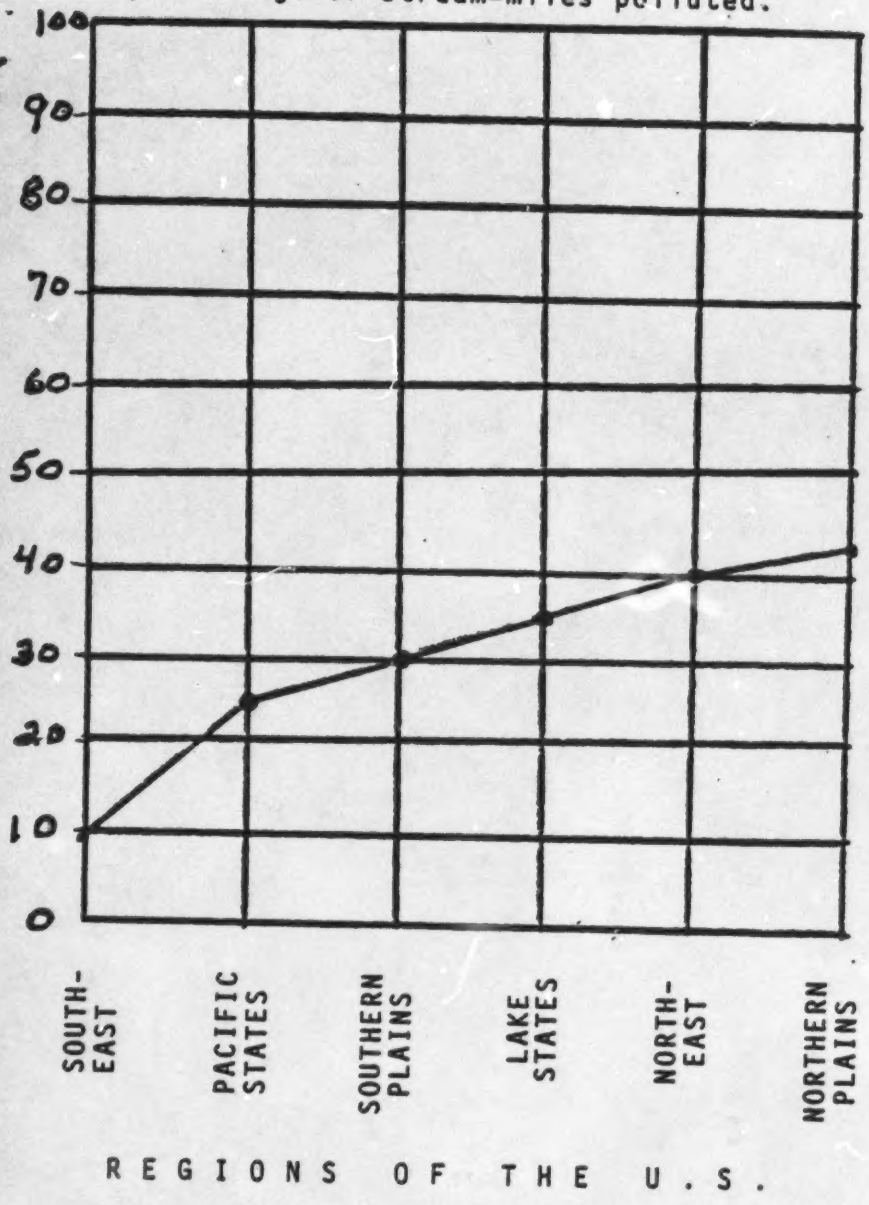
2. Between 1968 and 1969 what was the increase of oil spills from unidentified sources?

3. In 1969 what is the approximate number of oil spills from all sources?

4. In 1969 which source produced the largest number of oil spills, and how many?

5. List each source and give the amount of oil spills for each in 1968.

Regions of the United States and their percentage of stream-miles polluted.

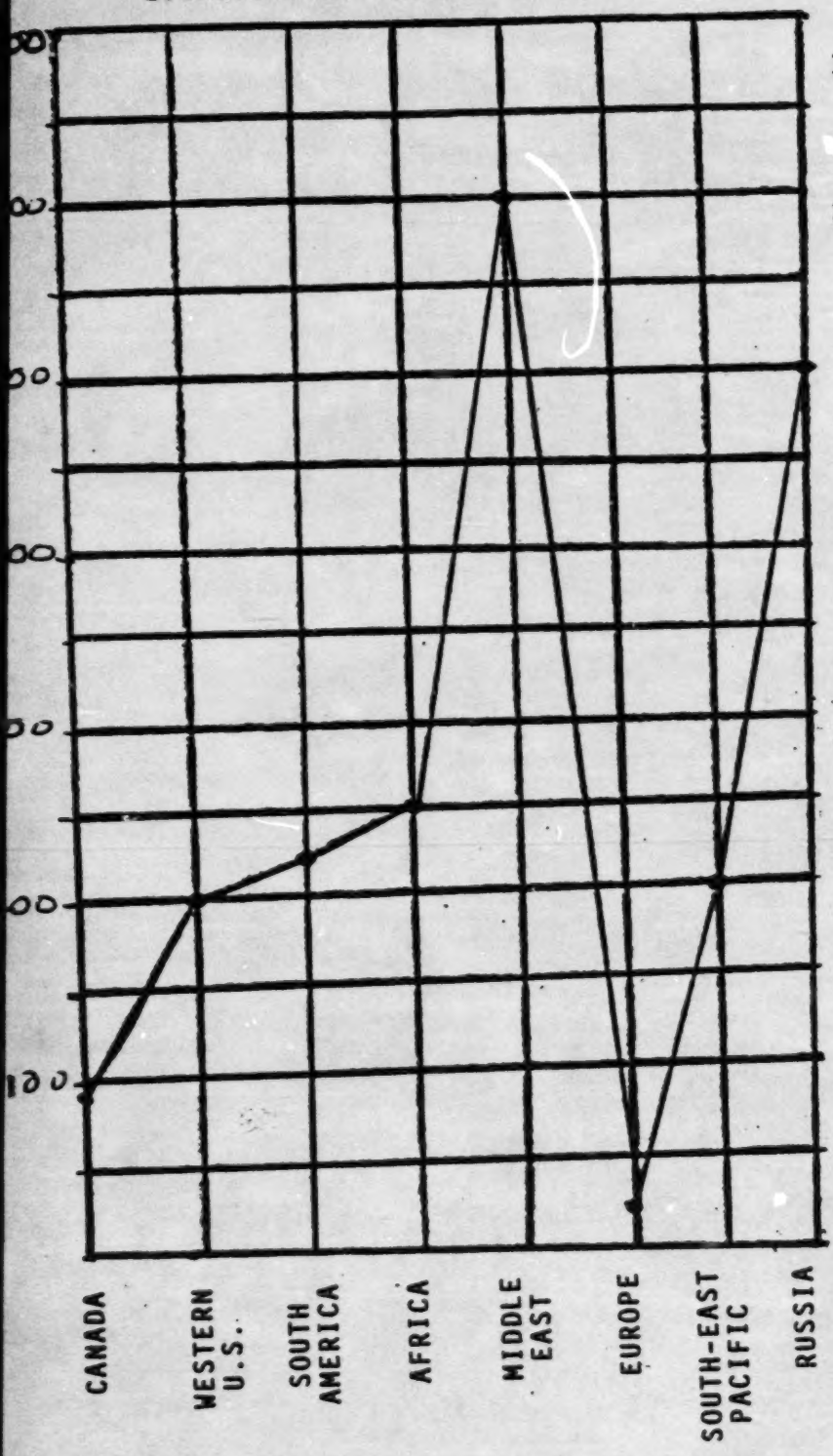


1. Which region of the United States has the largest percentage of streams polluted?

2. Which region has the smallest percent of polluted streams?

3. List each region and give the percent of its streams polluted.

LOCATIONS OF WORLD'S OIL RESERVES



1. Which area has the largest oil reserves and what amount?

2. Which two regions have the same amount of oil reserves. How many billion tons does each have?

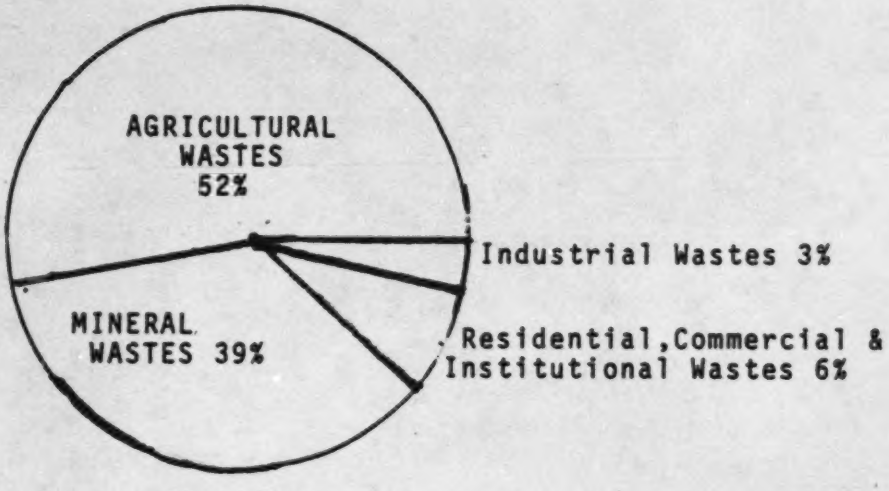
3. The least amount of oil reserves is located in_____ in the amount of _____billion tons.

4. Africa has_____ billion tons of oil reserves.

5. Canada has_____ billion tons of oil reserves.

II - Circle Graphs

A. In 1969 4,340 million tons of solid wastes were produced in the United States, according to the Council on Environmental Quality.



SOURCES OF SOLID WASTES, 1969

To find out how many million tons of mineral wastes, multipy 4340 million tons by 39%.

$$4340 \times 39\% = 4340 \times .39 = 1692.6 \text{ million tons}$$

1. Find the number of million tons of wastes produced by agriculture.

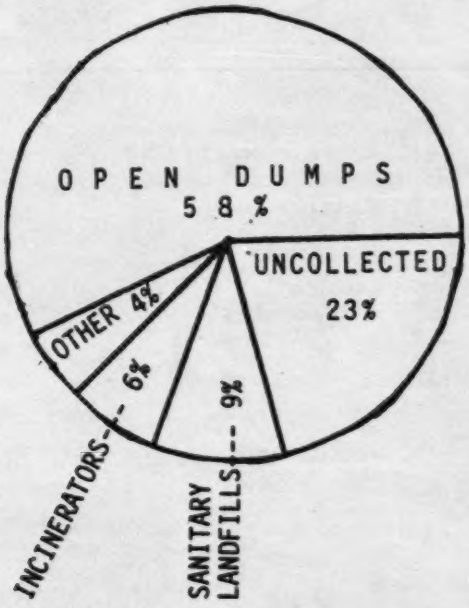
2. Find the number of million tons of wastes produced by industry.

3. Find the number of million ton of residential, commercial, and institutional wastes.

#X-41

B. Of the 260 million tons of solid wastes produced by residential, commercial, and institutional sources, the graph below shows how the wastes were disposed .

METHODS OF WASTE DISPOSAL



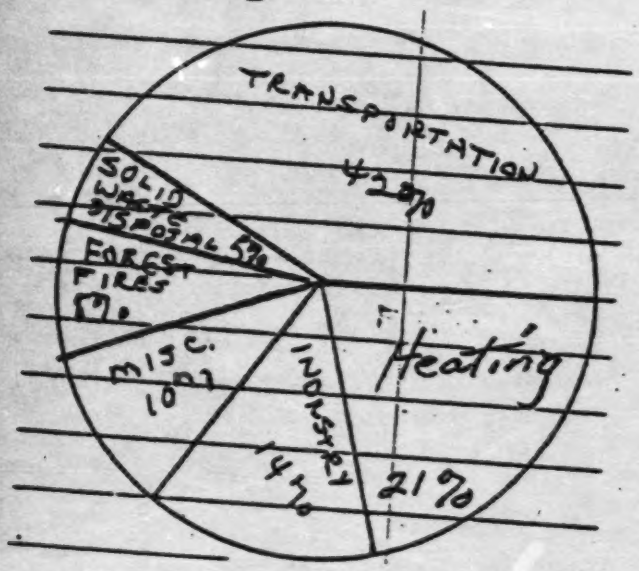
1. Indicate which is the largest category for waste disposal and find the number of million tons disposed in that manner.

2. The smallest category of disposal of wastes is_____and amounts to_____million tons.

3. Give the other categories and tell how many million tons of waste are disposed.

C. 200 million tons of air pollution were put out in 1970.

SOURCES OF AIR POLLUTION
IN 1970



1. The largest source of air pollution is_____. The smallest source is_____.

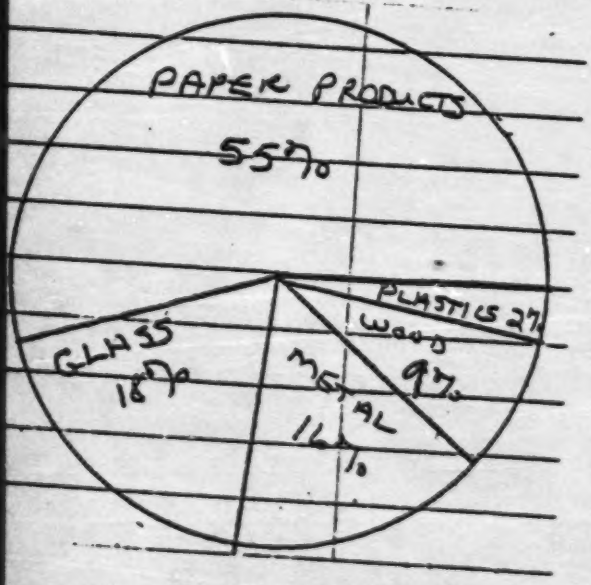
2. Forest fires account for_____ percent of air pollution. How many million tons would that be?

3. Industry accounts for _____% of the air pollution, which is _____million tons.

4. What percent and how many million tons of air pollution are classified as miscellaneous?

In 1966, 52 million tons of packaging materials were disposed of. The circle graph below shows the kinds of packaging materials and percentage of each kind.

PACKAGING MATERIALS
USED IN 1966



1. The smallest amount of packaging materials used is_____, and accounts for_____million tons.

2. The largest amount of packaging materials used is_____and accounts for_____million tons.

3. List the other types of packaging materials and calculate the amounts of each.

III - Charts

A. The intensity of sound is measured in decibels. At 100 decibels noise becomes uncomfortable. At 140 decibels the threshold of pain has been reached, (the ears begin to feel pain). The chart below gives common sounds and their decibel level.

D E C I B E L L E V E L S

SOUND	#DECIBELS
Room in a city dwelling at midnight	32
Average city residence	40
House party with band	115
Power lawnmower	96
Traffic at a residential intersection	82
Small 2-engine plane	85
Heavy truck (25 feet away)	90
Train whistle (500 feet away)	90
Subway	95
Outboard motor	102
Motorcycle	110
DC-2 (1500 ft.away)	100
Boeing 707 (1500 feet away)	115
Sports car	86
Supersonic transport	130

1. According to the chart, what sound has the lowest decibel level?

2. What sound has the highest decibel level?

(continued)

3. What sounds have the same decibel level?

4. What sounds have decibel levels at less than 50?

B. The following chart shows four different minerals and the time required geologically to produce one ton. It also shows man's removal rate in million tons per year of these minerals from the earth.

MINERAL	PRODUCTION TIME	MAN'S REMOVAL RATE
Petroleum	250 yrs.	600 million tons
Coal	1000 yrs.	2000 million tons
Lead	4000 yrs.	200 million tons
Iron	2000 yrs.	4 million tons

1. What mineral takes the longest time to produce?

2. Which mineral takes the least time to produce?

3. Which mineral is being removed from the earth at the fastest rate?

4. Which mineral is being removed from the earth at the lowest rate?

C. The following chart shows household activities and the amounts of water necessary for each.

HOUSEHOLD ACTIVITY	# GALLONS WATER
Tub Bath	35 Gals.
Shower	25 Gals.
Washing Dishes (Hand)	3.5 Gals
Dishwasher	12 Gals
Washing Machine	25 Gals.
Flushing Toilet	4 Gals.

1. Which uses less water, washing dishes by hand, or using a dishwasher?

2. Which conserves more water, tub baths or showers?

3. Which household activity uses the least amount of water?

4. Which household activity uses the most amount of water?

D. The following chart shows common household appliances, the average amount of kilowatts used, and the cost per month in a 5-room household.

APPLIANCE	KILOWATTS	COST ($.05 per KW)
Room Air-Conditioner	300	$15.00
14 Cu. Ft. Freezer	140	7.00
Microwave Oven	25	1.25
Oven	96	4.80
Refrigerator/Freezer	167	8.35
Stove	100	5.00
Dryer	80	4.00
Iron	13	.65
Washer	9	.45
Water Heater	183	9.15
Radio	8	.40
Color T.V.	100	5.00
Dishwasher	30	1.50
Toaster	3	.15
Hair Dryer	1	.05
Electric Blanket	22	1.10
Well Pump	20	1.00
Refrigerator	83	4.15

#X-41

Using the appliance chart on previous page solve these problems:

1. Which appliance uses the least amount of kilowatts? How much does it cost to use this appliance?

2. Which appliance uses the largest amount of kilowatts and how much does it cost?

3. How many kilowatts does an electric blanket use? What is the cost per month?

4. Which uses less kilowatts, a microwave oven or a regular oven?

5. Is it cheaper or more expensive to use a refrigerator/freezer combination than two separate appliances - refrigerator and freezer?

6. Which costs more, watching television or listening to the radio?

#X-41

ANSWER KEY

LINE GRAPHS

PAGE 2

A. 1) 1970 - 76,000
2) 1964 and 1965
3) 1964 and 1967
4) 4,000
5) 1960 - 3,000
1961 - 13,000
1962 - 15,000
1963 - 18,000
1964 - 25,000
1965 - 21,000
1966 - 25,000
1967 - 28,000
1968 - 32,000
1969 - 57,000
1970 - 76,000

PAGE 3

B. 1) 175
2) 75
3) 1,025
4) Vessels - 525
5) Vessels - 350
Shore Facilities - 300
Unidentified - 75

PAGE 4

C. 1) Northern Plains
2) South-East
3) South-East - 9%
Pacific States - 25%
Southern Plains - 30%
Lake States - 35%
North-East - 40%
Northern Plains - 42%

PAGE 5

D. 1) Middle East - 600 Billion Tons
2) Western U.S. and Southeast Pacific - 200 Billion Tons
3) Europe - 25 Billion Tons
4) 250 Billion Tons
5) 90 Billion Tons

ANSWER KEY

CIRCLE GRAPHS

PAGE 6

A. 1) 2256.8 Million Tons - Agriculture
2) 130.2 Million Tons - Industry
3) 260.4 Million Tons - Residential, Commercial & Institutional

PAGE 7

B. 1) Open Dumps - 150.8 Million Tons
2) Other - 10.4 Million Tons
3) Uncollected - 59.8 Million Tons
Sanitary Landfills - 23.4 Million Tons
Incinerators - 15.6 Million Tons

PAGE 8

C. 1) Transportation - largest
Solid Waste Disposal - smallest
2) 8% Air Pollution - 16 Million Tons
3) 14% - Industry -- 28 Million Tons
4) 10% - 20 Million Tons for Miscellaneous

D. 1) Plastic - 1.04 Million Tons
2) Paper Products - 28.6 Million Tons
3) Glass - 9.36 Million Tons
Metal - 8.32 Million Tons
Wood - 4.68 Million Tons

CHARTS

PAGES 9 & 10

A. 1) City dwelling at midnight
2) Supersonic transport
3) Heavy truck and Train whistle
4) City dwelling at midnight and Average city residence

(continued)

#X-41

PAGE 10 CONTINUED

B. 1) Lead
2) Petroleum
3) Coal
4) Iron

PAGE 11

C. 1) Washing dishes by hand
2) Showers
3) Washing dishes by hand
4) Tub baths

PAGE 12

D. 1) Hair Dryer - $.05
2) Air Conditioner - $15.00
3) 22 kw - $1.10
4) Microwave Oven
5) Cheaper
6) Watching television

Citrus 78
charts a/k